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BEFORE THE ARIZONA CORPORATION COMMISSION

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DOCKET CONTROL

IN THE MATTER OF THE APPLICATION OF ) DOCKET NO. E-01933A-10-0266  
TUCSON ELECTRIC POWER COMPANY FOR )  
APPROVAL OF ITS 2010 RENEWABLE ) **NOTICE OF FILING UPDATED**  
ENERGY STANDARD IMPLEMENTATION ) **RENEWABLE ENERGY**  
PLAN AND DISTRIBUTED ENERGY ) **STANDARD IMPLEMENTATION**  
ADMINISTRATIVE PLAN AND REQUEST FOR ) **PLAN**  
RESET OF RENEWABLE ENERGY ADJUSTOR )

Tucson Electric Power Company ("TEP" or the "Company"), through undersigned counsel, hereby submits its Updated 2011 Renewable Energy Standard Implementation Plan for Arizona Corporation Commission approval, in compliance with Arizona Administrative Code R14-2-1801 *et. seq.*

RESPECTFULLY SUBMITTED this 13<sup>th</sup> day of October, 2010.

TUCSON ELECTRIC POWER COMPANY

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OCT 13 2010

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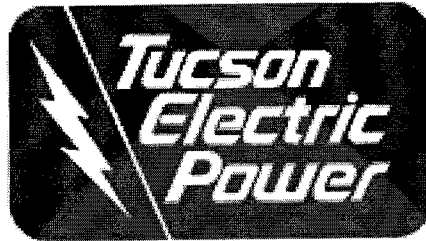
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A UniSource Energy Company

# **Tucson Electric Power Company**

## **Tucson Electric Power 2011 Renewable Energy Standard Implementation Plan**

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## **ATTACHED EXHIBITS**

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| Exhibit 1 | Energy and Demand by Technology Forecast  |
| Exhibit 2 | RES Budget  |
| Exhibit 3 | Definition of Market Cost of Comparable Conventional Generation                                 |
| Exhibit 4 | Above Market Cost of Comparable Conventional Generation by Technology<br>(Confidential)         |
| Exhibit 5 | Renewable Energy Credit Purchase Program  |
| Exhibit 6 | REST – TS1 Renewable Energy Standard Tariff   |
| Exhibit 7 | REST – TS2 Renewable Energy Standard Tariff (Customer Self-Directed Renewable<br>Energy Option) |
| Exhibit 8 | Research and Development Projects   |

## **I. EXECUTIVE SUMMARY**

Tucson Electric Power Company ("TEP" or "Company") has prepared its 2011 Renewable Energy Standard Implementation Plan ("Plan") in compliance with the Arizona Corporation Commission's ("Commission") Renewable Energy Standard ("RES") rules. TEP is committed to reaching the RES targets for 2011 and beyond, and the Plan sets forth the Company's strategy for meeting its RES requirements. The Plan outlines key components of that strategy, including the renewable energy resources the Company will add through 2015, the customer funding and surcharge amounts necessary to acquire those resources, the programs the Company plans to implement, and the amounts budgeted for each program. TEP seeks Commission approval of all elements of its Plan, as they are necessary for TEP to meet its compliance obligations under the RES rules.

Pursuant to Arizona Administrative Code Rule 14-2-1801, *et seq.*, TEP must obtain 3% of its 2011 annual retail sales from renewable resources by 2011, 25% of which must come from Distributed Generation ("DG"). In order to meet these requirements, TEP will utilize existing utility scale renewable generation, Purchase Power Agreements ("PPA") with renewable developers, short-term purchases of renewable energy, utility-owned renewable generation, and DG incentive programs. The resulting renewable portfolio will include solar, wind, and biomass projects.

Highlights of the 2011 Plan include: (1) the School Vocational Program, a DG program that will provide ten to fourteen systems ranging in size from four to seven kilowatts to eligible schools in the service territory; (2) the Zero-Net Energy Home ("ZEH") Pilot Program, an innovative project that integrates energy efficiency and renewable energy in the new home construction market; (3) the Bright Tucson Solar Buildout Plan, which will install 28 megawatts of solar by 2014; and (4) a Feed-In Tariff Pilot Program.

TEP has aggressively sought to achieve 2011 RES compliance as cost effectively as possible. The estimated cost for 2011 RES related projects and programs is \$37.6 million. This amount increases to \$44.3 million by 2015, with a five year total of \$222 million. This RES

funding is necessary to cover the cost of utility scale renewable generation, incentive payments for distributed generation resources, marketing expenses, program implementation, and administration costs. At this time, TEP requests recovery of approximately \$37.6 million for 2011 through its RES tariff. TEP believes that this Plan is a realistic and cost-effective strategy for complying with the RES requirements and provides the Commission with an important opportunity to foster renewable generation for the benefit of the Company's customers.

## **II. TEP 2011 IMPLEMENTATION PLAN COMPONENTS**

### **A. Utility-Scale Renewable Generation**

The RES targets two resource categories, utility-scale generation and distributed generation. TEP's total renewable generation requirement for 2011 is 3% of retail sales. TEP will meet its 2011 utility-scale requirement with an anticipated renewable generation capacity of approximately 60 megawatts ("MW") by the end of 2011. Of that capacity, 45 MW will come from renewable PPAs currently operating or with anticipated completion dates in 2011. The remaining 15 MW will come from TEP-owned renewable facilities.

The bulk of the renewable PPAs were submitted for Commission approval on May 25, 2010, and approved in Decision No. 71856 (August 24, 2010). As approved, the nine PPAs will allow TEP to procure over 105 MW of solar energy and 50 MW of wind energy by 2012. These projects will allow TEP to meet, and possibly exceed, its utility-scale RES requirement through 2016, assuming a 25% attrition rate. These PPAs comply with Decision No. 71702 (May 17, 2010), which required TEP to propose and file within this Plan a plan to procure at least 3.4 megawatts of solar from independent power providers. The chart below depicts TEP's utility-scale target and how TEP will exceed that requirement through 2016.

**Chart 1. Renewable Energy Standard Targets**

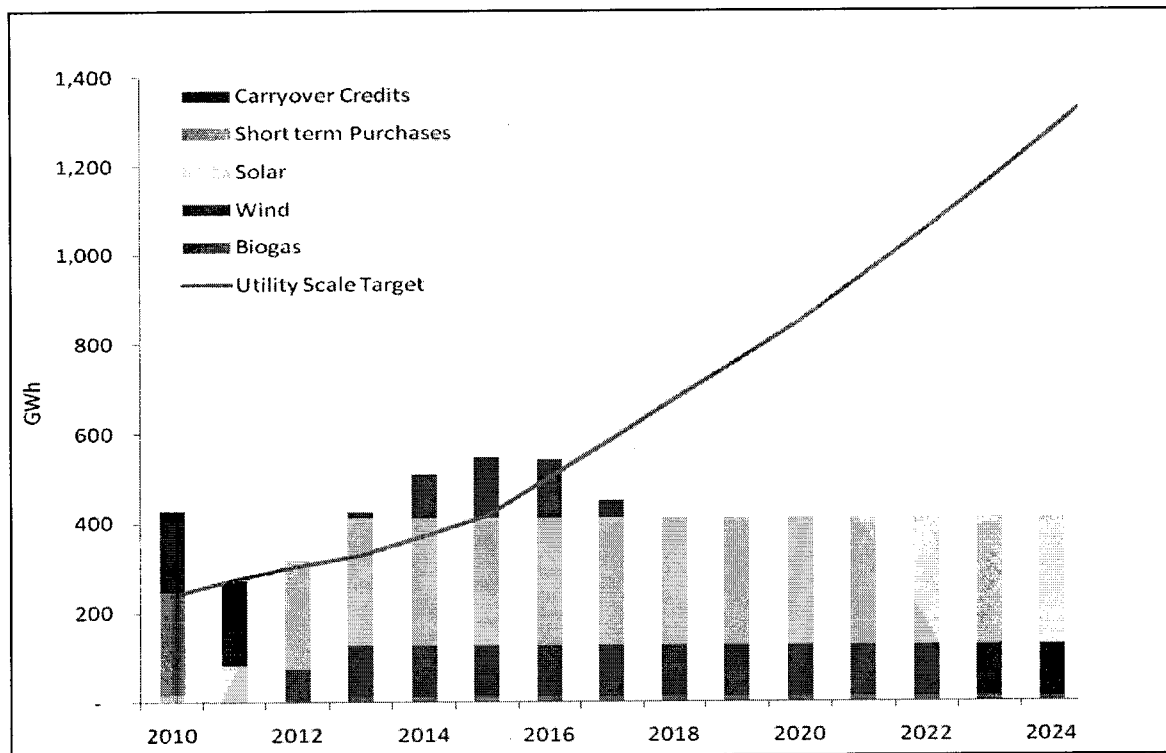


Table 1 depicts TEP's utility-scale projects. The projects are separated by those in existence and those planned for the future.

**Table 1. Utility Scale Generation**

Existing Renewable Generation					
Project	Capacity MW	Annual MWh	Technology	Expected In-Service Date	TEP Owned
SGS Solar	4.6	8,500	Fixed PV	Operational	Yes
<b>Total Existing</b>	<b>4.6</b>	<b>8,500</b>			
Future Renewable Generation					
Fotowatio Renewable Ventures	20	53,700	SAT PV	2012	No
SGS Solar Expansion	1.8	3,300	Fixed PV	2011	Yes
SOLON Community Solar	1.6	4,100	SAT PV	2010	Yes
Renewable Fuel LLC (Bell IPC)	5.5	17,600	Solar Thermal	2012	No
Sexton Energy	2.2	15,400	Bio-Mass	2013	No
Torch Renewable Energy, LLC	50	133,300	Wind	2012	No
CTC (First Light, LLC)	5	9,900	Fixed PV	2011	No
NRG Solar	25	57,800	Fixed PV	2011	No



Avalon Solar	35	64,400	Fixed PV	2012	No
ANS/EMCORE Solar	1.5	3,400	CPV	2012	No
Amonix Solar	1.5	4,100	CPV	2011	No
Amonix Solar	12	32,500	CPV	2011	No
Foresight Solar	4	10,200	SAT PV	2012	No
Foresight Solar	12	30,700	SAT PV	2012	No
<b>Total Future</b>	<b>177.1</b>	<b>440,400</b>			
<b>Bright Tucson Solar Buildout Plan</b>					
Solon Solar	10	25,000	SAT PV	2011 - 2012	Yes
TBD	10	25,000	TBD	2013 - 2014	Yes
<b>Total Future - BTSBP</b>	<b>20</b>	<b>50,000</b>			
<b>Total TEP Owned Projects</b>	<b>26.2</b>	<b>65,900</b>			

## B. Bright Tucson Solar Buildout Plan

The Bright Tucson Solar Buildout Plan ("Buildout Plan") represents the small portion of TEP's utility-scale requirement that will be met through a utility-owned program. The Buildout Plan is an essential component of the Company's renewable strategy; 85% of the Company's utility-scale generation will be met through PPAs, thus the Buildout Plan provides much needed balance to the Company's renewable portfolio. Additionally, the Buildout Plan provides some measure of financial project certainty, which is critical to the Company's ability to meet its RES requirements. Many solar projects in Arizona have been stalled or delayed due to financing problems; this is troubling for the utilities that rely on those projects in order to remain in compliance with the RES. Utility-owned projects also help to spread the risk of renewable projects between the renewable development community and TEP; in turn, this accelerates the deployment and commercial operation of solar energy for all of Arizona.

In particular, the Buildout Plan proposes a \$28 million per year investment in solar projects of 7 MW per year (based on an average installed per watt price of \$4.00). These utility-owned solar facilities will be installed between 2011 and 2014 as shown in Table 2, with a total output of 28 MW by 2014. This represents 23% of the renewable energy needed for TEP to meet its utility-scale generation requirement; the balance will still be met through PPAs. TEP is

requesting recovery treatment similar to that it received in Decision No. 71702 (May 17, 2010) and that the Commission granted to Arizona Public Service in Decision No. 71502 (March 17, 2010) and UNS Electric, Inc. in Decision No. 71914 (September 30, 2010). Like these previously approved projects, the Buildout Plan will utilize a competitive procurement process to ensure a fair and unbiased process is used to incorporate a full range of solar resource alternatives.

**Table 2. Bright Tucson Solar Buildout Plan Investment Timeline**

<b>Year Installed</b>	<b>Year Recovered</b>	<b>Annual Capital Investment</b>	<b>MW Capacity</b>
2011	2012	\$28,000,000	7.0 MW
2012	2013	\$28,000,000	7.0 MW
2013	2014	\$28,000,000	7.0 MW
2014	2015	\$28,000,000	7.0 MW
<b>4-Year Total</b>		<b>\$112,000,000</b>	<b>28 MW</b>

The annual revenue requirement, including return on investment, depreciation, property taxes, and operations and maintenance (“O & M”) expenses, as delineated in Table 3, will be recovered through the REST adjustor until the investment is included in rate base during the Company’s next rate case. Annual estimates of the Solar Buildout Plan’s revenue requirement (to be included in the REST adjustor) are shown in Table 4.

**Table 3. Revenue Requirement for the Bright Tucson Solar Buildout Plan**

<b>Revenue Requirement</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>
Carrying Costs	\$1,951,904	\$1,849,019	\$1,951,904	\$3,698,037
Book Depreciation	\$1,400,000	\$1,400,000	\$1,400,000	\$2,800,000
O & M	\$100,000	\$101,500	\$100,000	\$203,000
<b>Total Revenue Requirement</b>	<b>\$3,451,904</b>	<b>\$3,350,519</b>	<b>\$3,451,904</b>	<b>\$6,701,037</b>

**Table 4. Estimated Annual REST Budget<sup>1</sup> for the Bright Tucson Solar Buildout Plan**

Utility Owned Solar Projects by Year	2012	2013 <sup>2</sup>	2014	2015
2012	\$3,452	\$1,625		
2013		\$1,726		
2014				
2015			\$3,452	\$3,249
				\$3,451
Annual Revenue Requirement	\$3,452	\$3,351	\$3,452	\$6,701

### **C. Bright Tucson Community Solar Program**

On September 18, 2009, in Docket No. E-01933A-09-0340, TEP filed for approval of the Bright Tucson Community Solar Program. TEP received approval of this program, which consists of a voluntary customer tariff for community distributed solar energy on July 27, 2010, in Decision No. 71835. The program will fulfill a portion of the Company's distributed generation RES requirement by allowing customers to purchase blocks of green energy in 150 kilowatt hour ("kWh") increments. TEP will utilize solar power to generate the energy for this program. The first 1.6MW of energy for this program will come from a TEP owned project. It has not yet been decided, however, whether the remaining power will come from a utility-owned project or from PPAs.

### **D. Distributed Generation Incentive Program**

TEP looks forward to continuing the successful implementation of its DG programs. The Plan proposes \$26.6 million in funding for the incentive programs, with annual increases to accommodate both the increased DG energy target, and customer demand. The Plan uses the RES required 50/50 split of the DG energy requirement between the residential and commercial sectors, as shown in Exhibit 1. The DG program requirements and incentive levels are outlined in the Renewable Energy Credit Purchase Program ("RECPP"), included as Exhibit 5. Additions

<sup>1</sup> This analysis uses the existing cost of capital and assumes that customers benefit from a 30% Federal investment tax credit.

<sup>2</sup> Assumes solar assets are included in rate base as of Q3 of 2013 from the 2012 TEP rate case.

to the 2011 Plan include the School Vocational Program, and the Zero-Net Energy Homes Program. Each program is described below.

**i. Renewable Energy Credit Purchase Program**

The RECPP portion of TEP's Plan targets three areas: (1) residential up-front incentives ("UFI"); (2) non-residential UFIs; and (3) non-residential performance based incentives ("PBI"). The projected cost of the RECPP is \$23.9 million: \$14.4 million for residential UFIs, \$3.7 million for small commercial UFIs, and \$5.8 million for large commercial PBIs. TEP will fully satisfy the commercial portion of the RES's DG requirement through the RECPP portion of its Plan. Table 5 below outlines the 2011 incentive budget for each customer segment, including the megawatt hours ("MWh") and MW achieved.

**Table 5. UFI/PBI Budget and Forecast**

Customer Segment	2011 Budget	Annual MWh	Annual MW
Residential UFI	\$14,358,111	13,190	6.88
Small Commercial UFI	\$3,769,230	4,686	2.33
Large Commercial PBI	\$5,753,375	3,193*	1.98

\* The additional 4.893 MWh (2.9 MW) is Commercial DG from a REC only contract; \$1,275,000 cost in wholesale budget. The large commercial budget is not incremental. These dollars include projects funded in 2008, 2009, and 2010. The MWh and MW are incremental. The budget for the 2011 incremental increase to large commercial is \$384,375.

TEP experienced great success with its UFI and PBI programs for 2010. Thus, TEP proposes the following refinements for its 2011 Plan. Residential incentives will remain at the current rates, which were reduced from \$3.00 per watt to \$2.00 per watt by the Commission in Decision No. 71844 (August 25, 2010). Small commercial incentives will remain at \$1.50 per watt, and the commercial hot water UFI-limit will be raised from 35,000 kWh to 400,000 kWh. The small commercial UFI budget will be separated from the residential UFI and commercial PBI budgets in order to ensure its viability, and the 2010 builder program will be replaced with the ZEH Pilot Program. Technical requirements for the RECPP will be updated, and three

categories for larger PV systems will be implemented.

Incentives for these larger PV systems will be lowered to align them with current prices, as shown in Table 6. For more details on the RECPP, please see the attached Exhibit 5.

**Table 6. Production Based Incentive Categories**

<b>PBI Category</b>	<b>Max REC Price</b>
50-500 kW AC	\$0.142
500-1000 kW AC	\$0.122
Above 1 MW	\$0.102

In order to keep the programs going throughout the year, and to avoid “wait list” issues, TEP is also proposing an automatic trigger to further reduce incentives if the annualized pace of compliance for the residential and commercial UFI programs is exceeded early, as shown in Table 7. The Company will activate the trigger approximately 30 days after the sum of total reservations for either program reaches 60% of the annual budgeted number referenced in Table 5. The trigger date will be set to coincide with close of business on the Friday closest to the actual 30th day. The Company will post its current year-to-date reservation totals on its website and on the AZGoesSolar site (if feasible), and will notify the Commission of its intent to reset the incentive as described herein.

**Table 7. Automatic Incentive Reductions**

<b>Customer Segment</b>	<b>2010 Incentive</b>	<b>2011 Incentive</b>	<b>Reduced Incentive Post Trigger (60% compliance on or before 6/30/2011)</b>
Residential UFI	\$2.00/watt	\$2.00/watt	\$1.75/watt
Small Commercial UFI	\$1.50/watt	\$1.50/watt	\$1.25/watt

## **ii. School Vocational Program**

In addition to the changes described above, TEP plans to implement a DG program for eligible schools in its service territory. This program will provide ten to fourteen PV systems ranging in size from four to seven kilowatts to eligible high schools. TEP will supply and install the necessary system equipment in addition to creating and facilitating a vocational training program in coordination with state energy program training efforts supported by American Reinvestment Recovery Act funds. The program is designed so that the number of eligible high schools in a school district is proportional to the size of the district within TEP's service territory to ensure that each district is eligible to receive at least one system. TEP will work closely with district officials to determine appropriate sites. The estimated cost of this project is \$500,000.

## **iii. Zero-Net Energy Homes Pilot Program**

TEP's ZEH Program is an innovative renewable energy project integrating energy efficiency and renewable energy in the new home construction market. This program, approved by the Commission in Decision No. 71638 (April 14, 2010), is designed to promote the use of renewable energy technology, including PV and solar hot water, in the residential new home construction market.<sup>2</sup> The program will use funds from the Demand-Side Management Surcharge to incent builders to follow high-efficiency construction standards in their projects and to include renewable technology. Details of the ZEH Pilot Program can be found in Docket Nos. E-01933A-07-0402 and E-01933A-05-0650.

## **E. Feed-In Tariff Pilot Program**

As part of the 2011 Plan, TEP intends to implement a Feed-In Tariff ("FIT") Pilot Program. TEP's FIT Pilot Program is open to consumers, non-profit groups, government consumers, and developers. The parameters of the program require an appropriate site for any

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<sup>2</sup> The ZEH Program is replacing the former Builder Credit Purchase or Guarantee Solar Program. The former program was designed as a temporary program to promote the use of renewable resources in the new home construction market until an integrated plan could be developed. Effective January 1, 2011, the ZEH Pilot Program will replace the Builder Credit Purchase Program.

RES defined renewable system that does not have a sizeable load requirement. The participant can own, lease, or have other access to the appropriate site as long as the energy produced can bypass local loads, flowing directly into the grid. TEP will purchase both the energy and the RECs from such systems, and the proposed tariff would combine both purchases into one price. The customer would be required to purchase, construct, and maintain the site (which must be within TEP's service territory) for the duration of the 20-year contract.

For the 2011 pilot, only projects ranging in size from 10 kW to 750 kW will be allowed to participate. Additionally, sites approved for inclusion in the FIT Pilot Program will be ineligible for participation in other RES programs. Projects will be weighted on several factors, including competitive pricing, whether the system is within a constrained micro grid, project viability, and environmental impacts such as water use, local content, and in-service dates. TEP will utilize these projects and their RECs to satisfy its non-residential DG RES requirement. The budget for this program is \$525,000 with approximately \$450,000 to be collected through the RES adjustor. (The remainder will be collected through the Purchase Power and Fuel Adjustment Clause as determined by the Market Cost of Comparable Conventional Generation) The proposed tariff schedule and budget by project size appear in Table 8 and 9 below.

**Table 8. FIT Tariff Schedule**

Category	Cap per REC & kWh	Term
10 - 100 kW	\$0.20 per kWh	20 year term
101 - 400 kW	\$0.18 per kWh	20 year term
401 - 750 kW	\$0.16 per kWh	20 year term

**Table 9. Allocated Segments - Total Cost including MCCCCG**

Size (kW)	Budget	Potential (kW)
10-100	\$140,000	412
101-400	\$175,000	572
401-750	\$210,000	772
<b>Total</b>	<b>\$525,000</b>	<b>1,756</b>

#### **F. Market Cost of Comparable Conventional Generation**

Consistent with the RES rules, TEP calculates program expenses using the Market Cost of Comparable Conventional Generation ("MCCCCG"). Details on the methodology for the MCCCCG calculation are included in the attached Exhibit 3. The annual MCCCCG rates are calculated in advance and stated as a single dollar per megawatt hour value by technology type. The expenses are based on the PPAs pricing after subtracting the corresponding MCCCCG based on projected hourly energy profiles and are included in Exhibit 4 (confidential). The profiles are determined by TEP's production cost model. The MCCCCG will be included for wind, PV systems, concentrated solar with storage, and bio-fueled renewable resources.

### **III. The Plan Budget**

As stated previously, the cost to implement TEP's Plan will be \$37.6 million. The Plan's detailed budget is attached as Exhibit 2. Within Exhibit 2 is a breakdown of the costs for purchased renewable energy, the DG programs, research and development, outside services support and reporting, technology, cost recovery of DG fixed costs,<sup>3</sup> and marketing. A high level budget is shown in Table 10.

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<sup>3</sup> Cost Recovery of Distributed Generation Fixed Costs: The issue of unrecovered fixed costs resulting from both the RES and the newly proposed Energy Efficiency Rules has been an on-going topic with the Commission and all regulated utilities in 2009 and 2010. The Commission has been responsive to this concern and issued a Notice of Inquiry regarding disincentives and possible decoupling. The Commission is currently reviewing the matter fully and will decide how to proceed. The Company is submitting this request assuming that the issue of cost recovery for unrecovered fixed costs will be determined prior to adoption of the 2011 RES Implementation Plan.



**Table 10. Plan Budget by Category**

Utility Scale	\$ 6,723,000
Residential UFI	\$14,358,000
Commercial UFI	\$3,769,000
Commercial PBI	\$5,753,000
FIT Pilot	\$450,000
School Vocational & Other Training	\$736,000
Marketing & Outreach	\$ 750,000
Other Costs (Metering, I.T., Reporting & Labor, and R&D)	\$5,061,000
<b>TOTAL</b>	<b>\$37,600,000</b>

**IV. The 2011 RES Tariff**

The Plan will impose a charge of \$0.008636/kWh, with caps by customer class. The caps are developed using a past-approved methodology (proportional cap allocation). The Plan's tariff is set forth in the attached Exhibit 6. Additionally, the Customer Self-Directed Tariff is set forth in the attached Exhibit 7. Below is a table detailing the Company's approved budget for 2010 (Decision No. 71465 (January 26, 2010)) and proposed budget for 2011 delineated by rate class. TEP intends to increase the monthly caps for each customer class, as set forth in Table 12.

**Table 11. 2010/2011 REST Budget by Rate Class**

<b>Rate Class</b>	<b>2010 Approved RES Budget</b>	<b>2011 Proposed RES Budget</b>
<b>Residential</b>	\$12,499,164	17,878,864
<b>Small Commercial</b>	\$12,020,670	11,930,311
<b>Large Commercial</b>	\$5,014,431	5,537,487
<b>Industrial &amp; Mining</b>	\$1,211,862	1,207,625
<b>Public Authority</b>	\$770,320	749,983
<b>Lighting (PSHL)</b>	\$292,138	281,662
<b>Total</b>	<b>\$31,808,586</b>	<b>37,585,931</b>

**Table 12. Current and Proposed Caps by Customer Class**

<b>Rate Class</b>	<b>Current Rates Caps</b>	<b>Proposed Rates Caps</b>
Residential	\$3.20	\$4.88
Small Commercial	\$160.00	\$160.00
Large Commercial	\$760.00	\$760.00
Industrial & Mining	\$3,600.00	\$3,600.00
Public Authority	\$160.00	\$160.00
Lighting (PSHL)	\$160.00	\$160.00
<b>Per kWh to all Classes</b>	<b>\$0.0086</b>	<b>\$0.0086</b>

## **V. Research and Development**

In order to support the adoption of renewable energy, TEP dedicates some of its current REST funding towards research and development. The table below outlines the proposed budget for research and development. TEP plans to continue its commitment to furthering renewable energy research by participating in the projects identified in Table 13 and discussed in more detail below. For more details on these projects, see Exhibit 8.

**Table 13. TEP's Research and Development Budget by Project**

<b>Research and Development Initiatives</b>	<b>Budget</b>
AzRISE Research	\$ 250,000
TEP Test Yard	\$ 300,000
Grid Stability Ongoing Study	\$ 150,000
EPRI Study Tracks	\$ 300,000
Davis-Monthan Air Force Base DG Circuit Analysis	\$ 50,000
<b>Total</b>	<b>\$ 1,050,000</b>

**A. Arizona Research Institute for Solar Energy**

The Arizona Research Institute for Solar Energy ("AzRISE") Global Institute at the University of Arizona conducts fundamental interdisciplinary solar energy research backed by accurate and realistic economic analyses. This research is pivotal to the deployment and practical implementation of solar energy solutions. TEP believes this research is an important step in advancing the RES's goals. AzRISE support will cost \$250,000.

**B. TEP Test Yard Plan**

TEP continues to provide training and testing of new solar products at the Irvington/Sundt test yard, where several manufacturers of PV products participate. TEP is working with the University of Arizona in tracking and assessing PV product data to determine product longevity, reliability, and applicability to various residential and commercial locations in Tucson. The research and development technology budget total for the test yard projects is \$300,000.

**C. Grid Stability Study**

TEP will contract with Utility Solar Engineering ("USE") to provide solar generation resource integration information at a feeder, substation, switchyard, and system-wide level. The cost estimate for this program is \$150,000.

#### **D. Electric Power Research Institute Plan**

TEP is planning to subscribe to the Electric Power Research Institute in 2011 in order to acquire several renewable project studies. The estimated cost of subscription is \$100,000. An additional \$200,000 will be subscribed to study renewable transmission impacts.

#### **E. Davis-Monthan Air Force Base DG Circuit Analysis**

TEP will contract with USE to provide information regarding two Davis-Monthan Air Force Base feeders that interconnect with a large ground mount and many roof mounted PV systems. Impacts to electrical supply characteristics will be assessed for a high percentage of solar generation within a distribution feeder. The cost estimate for this program is \$50,000.

# EXHIBIT

"1"

# Exhibit 1 TEP Energy and Demand Forecast

Item	2011	2012	2013	2014	2015
RES Annual Renewable Energy Percentage	3.00%	3.50%	4.00%	4.50%	5.00%
Net Retail Energy Sales In MWh per Year	9,708,686	9,941,971	10,183,594	10,411,802	10,647,860
Renewable Energy Required - MWh	291,261	347,969	407,344	468,531	532,393
Minimum Distributed Energy %	25.00%	30.00%	30.00%	30.00%	30.00%
Minimum Distributed Energy MWh	72,815	104,391	122,203	140,559	159,718
Minimum Residential Distributed Energy %	12.50%	15.00%	15.00%	15.00%	15.00%
Minimum Residential Distributed Energy MWh cumulative	36,408	52,195	61,102	70,280	79,859
Incremental Residential DG Required MWh (or actual if available)	13,190	15,788	8,906	9,178	9,579
Estimated Residential DG MWh Cumulative (Include Reserved)	36,408	52,195	61,102	70,280	79,859
Maximum Commercial Distributed Energy %	12.50%	15.00%	15.00%	15.00%	15.00%
Maximum Commercial Distributed Energy MWh	36,408	52,195	61,102	70,280	79,859
Incremental Commercial DG Required MWh (or actual if available)	2,597	15,788	8,906	9,178	9,579
Estimated Commercial DG MWh Cumulative (Include Reserved)	36,408	52,195	61,102	70,280	79,859
2011 Commercial Target	12,771				
Annual PBI Budget	\$453,375	\$520,997	\$271,640	\$256,987	\$244,272
Utility Scale Energy Requirement %	75.00%	70.00%	70.00%	70.00%	70.00%
Utility Scale Energy Requirement MWh	218,445	243,578	285,141	327,972	372,675
Incremental Utility Scale Required MWh (or actual MWh)	29,354	25,133	41,562	42,831	44,703
Residential PV UFI	\$2.00	\$1.50	\$1.25	\$1.00	\$0.75
Small Commercial PV UFI	\$1.50	\$1.25	\$1.00	\$0.75	\$0.50
Large Commercial PV PBI	\$0.142	\$0.132	\$0.122	\$0.112	\$0.102
TEP DG Budget Requirements	2011	2012	2013	2014	2015
DG kWh required	72,815,149	104,390,699	122,203,127	140,559,330	159,717,905
Residential UFI cumulative required	36,407,574	52,195,350	61,101,563	70,279,665	79,858,952
Existing UFI kWh	23,217,708	36,407,574	52,195,350	61,101,563	70,279,665
UFI kWh required by year	13,189,866	15,787,775	8,906,214	9,178,102	9,579,287
PBI cumulative required	36,407,574	52,195,350	61,101,563	70,279,665	79,858,952
Existing PBI kWh	33,810,358	36,407,574	52,195,350	61,101,563	70,279,665
PBI kWh required by year (plugged in 2011)	6,385,563	7,893,888	4,453,107	4,589,051	4,789,644
Total Incremental PBI MW (Less 50% per year due to DMAFB)	1.88	2.32	1.31	1.35	1.41
Small Comm carveout from overall commercial (PBI 50 - 50)	6,385,563	7,893,888	4,453,107	4,589,051	4,789,644
Res PV%	90%	90%	90%	90%	90%
Res H2O%	10.0%	10.0%	10.0%	10.0%	10.0%
Small Comm PV %	90.0%	90.0%	90.0%	90.0%	90.0%
Small Comm H2O %	10.0%	10.0%	10.0%	10.0%	10.0%
Res PV kWh	11,870,879	14,208,998	8,015,592	8,260,292	8,621,359
Res H2O kWh	1,318,987	1,578,778	890,621	917,810	957,929
Small Comm PV kWh	5,747,006	7,104,499	4,007,796	4,130,146	4,310,679
Small Comm H2O kWh	638,556	789,389	445,311	458,905	478,964
Res PV kw (1750kwh/kw)	6,783	8,119	4,580	4,720	4,926
Res PV systems (6 kW average)	1,131	1,353	763	787	821
Small Comm PV kW (each year 1 MW subtracted for DMAFB)	2,284	3,060	1,290	1,360	1,463
Small Comm PV systems (40 kW average)	57	44	18	19	21
Res H2O systems (2500 kWh average)	528	632	356	367	383
Small Comm H2O systems (20,000 kWh average)	32	39	22	23	24
Res PV Cost	\$ 13,566,719	\$ 12,179,141	\$ 5,725,423	\$ 4,720,167	\$ 3,694,868
Res H2O Cost @ \$1,500 per system average	\$ 791,392	\$ 947,267	\$ 534,373	\$ 550,686	\$ 574,757
Small Comm H2O Cost @ \$10,750 per system average	\$ 343,224	\$ 424,296	\$ 239,354	\$ 246,661	\$ 257,443
Small Comm PV Cost	\$ 3,426,006	\$ 3,824,642	\$ 1,290,169	\$ 1,020,062	\$ 731,623
Total Cost Res UFI	\$ 14,358,111	\$ 13,126,407	\$ 6,259,796	\$ 5,270,853	\$ 4,269,625
Total Cost Small Comm UFI	\$ 3,769,230	\$ 4,248,939	\$ 1,529,524	\$ 1,266,724	\$ 989,066
Total UFI Cost	\$ 18,127,341	\$ 17,375,346	\$ 7,789,320	\$ 6,537,577	\$ 5,258,691
Total Incremental PBI Cost	\$ 453,375	\$ 520,997	\$ 271,640	\$ 256,987	\$ 244,272
Total PBI Cumulative Cost	\$ 5,753,375	\$ 6,274,372	\$ 6,546,011	\$ 6,802,998	\$ 7,047,270
Total DG Incentive Cost	\$ 23,880,716	\$ 23,649,718	\$ 14,335,331	\$ 13,340,575	\$ 12,305,961
Residential PV Incentive	\$ 2.00	\$ 0.122			
Small Commercial PV Incentive	\$ 1.75	\$ 0.105			
Large Commercial Incentive	\$1.70 - \$2.35	\$0.102 - \$0.142			
Utility Scale Projects	\$ 1.00	\$ 0.06			

UFI Equivalent/Watt	PBI Equivalent/REC
\$ 2.00	\$ 0.122
\$ 1.75	\$ 0.105
\$1.70 - \$2.35	\$0.102 - \$0.142
\$ 1.00	\$ 0.06

EXHIBIT

"2"

## Exhibit 2

### TEP Renewable Energy Standard Tariff Cost Recovery Factors Definition for 2011

<b>Total REST Budget &amp; Tariff Collection 2011:</b>		<b>\$ 37,585,221</b>
<b>Purchased Renewable Energy:</b>		
Above Market Cost of Conventional Generation calculated annually on hourly data per MCCCC Matrix <sup>aa</sup>	\$	3,268,184
2008 REC only contract	\$	1,275,000
TEP owned	\$	1,758,759
Independent Auditor cost	\$	40,000
Internal labor <sup>ab</sup>	\$	381,000
<b>Total</b>	<b>\$</b>	<b>6,722,943</b>
<b>Customer Sited Distributed Renewable Energy:</b>		
Up-front Incentive (UFI) (residential) <sup>ba</sup>	\$	14,358,111
Up-front Incentive (UFI) (commercial) <sup>bb</sup>	\$	3,769,230
Annual Performance-based Incentive (PBI) <sup>bc</sup>	\$	5,753,375
Internal labor <sup>bd</sup>	\$	557,000
External labor <sup>be</sup>	\$	350,000
Annual meter reading cost <sup>bf</sup>	\$	15,625
Support tools, materials, transportation and supply cost <sup>bg</sup>	\$	75,000
Outside services and internal labor for outreach, marketing materials, education and website maintenance cost <sup>bh</sup>	\$	750,000
Cost-of-service contracts for outside labor for inspections and maintenance <sup>bi</sup>	\$	100,000
Loss of revenue from the fixed-cost portion of customer charges displaced by customer self generation <sup>bj</sup>	\$	364,206
Customer Self-directed Program	\$	500,000
<b>Total</b>	<b>\$</b>	<b>26,592,547</b>
<b>2011 FIT Pilot</b>	<b>\$</b>	<b>450,000</b>
<b>Technical Training:</b>		
Schools Vocational Training Program	\$	500,000
TEP internal and contractor training costs <sup>ca</sup>	\$	236,000
<b>Total</b>	<b>\$</b>	<b>736,000</b>
<b>Information Systems Integration Costs</b>	<b>\$</b>	<b>600,000</b>
<b>Metering:</b>		
Direct material cost for meters <sup>da</sup>	\$	486,685
DG meter impact cost analysis <sup>db</sup>	\$	300,000
Direct energy credit purchase cost (12 mo. True-up) <sup>dc</sup>	\$	29,045
<b>Total</b>	<b>\$</b>	<b>815,730</b>
<b>Program Design, Reporting, and Administration:</b>		
Annual Compliance Report and hearing cost <sup>ea</sup>	\$	184,000
Annual Planning and Implementation Report and hearing cost <sup>eb</sup>	\$	144,000
Analysis and Administration <sup>ec</sup>	\$	110,000
AZ Solar website	\$	150,000
<b>Total</b>	<b>\$</b>	<b>588,000</b>
<b>Renewable Energy Research and Development:</b>		
Technology development projects – solar test yard costs <sup>fa</sup>	\$	300,000
Support provided to University research projects (eg. AzRise) <sup>fb</sup>	\$	250,000
Grid stability analysis, EPRI research, & other RE research costs <sup>fc</sup>	\$	500,000
Dues and Fees	\$	30,000
<b>Total</b>	<b>\$</b>	<b>1,080,000</b>
<b>2010 Program Cost (Total Budget)</b>	<b>\$</b>	<b>37,585,221</b>
<b>Overcollection of REST Funds from 2009 <sup>ga</sup></b>	<b>\$</b>	<b>-</b>
<b>Grand Total (to be collected in 2011 tariff)</b>	<b>\$</b>	<b>37,585,221</b>



**Notes:**

**aa:** 51,206 MWh @ \$63.82 per MWh above cost of MCCCCG – Purchased Power. Contracts are in addition to existing power purchase contracts, costs are incremental and caused by renewable purchased power contracts.

**ab:** Contract administration, settlement review, payment approval, internal overhead – internal TEP personnel, 3 FTE.

**ba:** est. 1,131 PV systems, 528 SHW systems. See Exhibit 1

**bb:** est. 57 PV systems, 32 SHW systems. See Exhibit 1

**bc:** Commercial PBI: Solar PV – 100% \* 3.2 GWh/yr/ @ \$0.14.2 = \$0.45 M. Additional payments from 2008-2010 add \$5.3M.

**bd:** Internal TEP personnel - 5 FTE

**be:** 1 FTE Consultant, 2 FTE contract Technical Assistants, other general consulting costs

**bf:** Historic cost basis

**bg:** Vehicles, small tools, and consumables for 2 mobile units

**bh:** Direct-outreach education expense with providers. Includes media purchases, printing, and design.

**bi:** Used for annual inspections, customer support. Based on historic costs

**bj:** 2009 DG production of 6,070,105 kWh @ \$0.06 for Fixed Cost Recovery Shortfall

**ca:** Includes costs for training and technical seminars in renewable technologies for TEP employees, and Building Performance Institute training to provide energy audits for prospective residential renewable customers.

**da:** incremental costs for net meters, full costs for production meters, data monitors, disconnects, and meter panels

**db:** Energy analysis to collate data, prepare and review cost impacts and effect on lost revenues of net metering and potential system benefits

**dc:** Estimate based upon approx. 2,747 PV systems @ average 148 kWh credit @ \$0.05 per kWh

**ea:** Historic cost basis, extrapolated to a larger program with more reporting factors.

**eb:** Historic cost basis, extrapolated to a larger program with more reporting factors.

**ec:** Historic cost basis, extrapolated to a larger program with more reporting factors.

**fa:** Estimated based upon project size and mix

**fb:** Funding support for projects to fund renewable research at such entities as AzRise

**fc:** Cost of performing annual analysis of hourly delivery intermittencies on grid stability in order to better understand grid impact of intermittent generation sources. Also used to enhance forecasting of renewable development. This research is in addition to existing power purchase analysis. Also includes costs for research performed by EPRI and other sources.

<b>ga:</b> All overcollection of REST funds from 2009 were included in the 2010 REST Budget per Decision No. 71465. All funds overcollected in 2009 will either be spent or reserved during calendar year 2010.	\$	29,025,014	2009 collection
	\$	18,862,343	2009 expenses
	\$	10,162,671	2009 overcollection
	\$	5,600,000	2009 dollars pulled into 2010 from Decision No. 71465
	\$	6,426,680	residential reservation used in 2010
	\$	(1,864,009)	balance

# EXHIBIT

"3"

**Market Cost of Comparable Conventional Generation  
2011 Renewable Energy Standard and Tariff**

**I. OVERVIEW**

Consistent with the Renewable Energy Standard ("RES") Rules passed by the Arizona Corporation Commission ("Commission"), Tucson Electric Power Company's ("TEP") Renewable Energy Standard and Tariff Implementation Plan contemplates recovery of expenses in excess of the Market Cost of Comparable Conventional Generation ("MCCCG"). The Commission provided guidance on defining MCCCG in the context of its RES Rules and identified the MCCCG as "the Affected Utility's energy and capacity cost of producing or procuring the incremental electricity that would be avoided by the resources used to meet the Annual Renewable Energy Requirement, taking into account hourly supply and demand circumstances. Avoided costs should include any avoided transmission, distribution, and environmental compliance costs." This exhibit defines the methodology for developing the MCCCG rate for the Company.

**II. METHODOLOGY**

Annual MCCCG rates shall be calculated in advance and stated as a single \$/MWh value by renewable technology type. The renewable technology types will be based on projected hourly energy profiles for each type of renewable resource. Annual MCCCG rates will include renewable resources such as wind resources, photovoltaic systems, concentrated solar with storage, and bio-fueled resources. Specific MCCCG rates would be developed as needed when new renewable technologies or new purchase power agreements are added to the Company's renewable portfolio. Annual MCCCG rates will capture the value of the seasonality and time of day delivery by deriving an average of on and off peak dispatch costs weighted by on and off peak renewable generation. MCCCG rates shall be calculated each year using the companies production cost simulation software 'Planning & Risk'. The hourly MCCCG rate determination criteria are shown in Table 1 below by comparing the types of renewable generation with the

### TEP Exhibit 3

resource dispatch type. All projected MCCCCG hourly rates are based on a 'Planning & Risk' production cost simulation that forecasts adequate generation and transmission capacity to meet all firm load obligations including system reserve requirements. Finally, the cost of renewable generation above the annual MCCCCG rates will be recovered through the REST Adjustor Mechanism and REST Tariff.

**Table 1 - MCCCCG Hourly Rate Determination Matrix**

Types of Renewable Generation Resources					
Resource Dispatch Type		Dispatchable Renewable Generation	Firm Renewable Generation	Non-Firm Renewable Generation	Curtailable Non-Firm Renewable Generation
	Wholesale sales transaction served from existing resource portfolio	The MCCCCG rate will be based on projected incremental production costs to serve firm load and wholesale sales opportunities for that hour. Costs will include any projected transmission, distribution and environmental compliance costs.			
	No market transactions. Generation available from thermal resource portfolio.				
	Day, week or month ahead purchase transaction to serve firm load requirements.	The MCCCCG rate will be based on the projected day, week or month-ahead firm purchase power transactions committed for that hour. Costs will include any projected transmission, distribution and environmental compliance costs.			
	Spot market transaction to serve firm load requirements.	The MCCCCG rate will be based on the projected Palo Verde spot market price for that hour. Costs will include any projected transmission, distribution and environmental compliance costs.			

### III. CALCULATION

$$MCCCG_{on} = \text{Annual Average On Peak MCCCG Rate} = \frac{\sum_{i=1}^{8760} PR_i * G_i * X_i}{\sum_{i=1}^{8760} G_i * X_i}$$

$$MCCCG_{off} = \text{Annual Average Off Peak MCCCG Rate} = \frac{\sum_{i=1}^{8760} PR_i * G_i * (1 - X_i)}{\sum_{i=1}^{8760} G_i * (1 - X_i)}$$

$MCCCG_{Annual Rate}$  = Average of on and off peak MCCCG rate weighted by projected on and off peak renewable generation.

*It is assumed that there is a specific MCCCG rate for each renewable technology type.*

Where

$PR_i$  = Projected Planning & Risk dispatch cost (\$/MWh) for hour  $i=1,2,...,8760$ .

$G_i$  = Projected energy generation in renewable technology resource profile for hour  $i=1,2,...,8760$ .

$X_i = \begin{cases} 1 & \text{if hour } i \text{ is an on peak market hour} \\ 0 & \text{Otherwise} \end{cases} \text{ for } i = 1, 2, \dots, 8760$

**Table 2 – TEP's 2011 MCCCG Annual Rates**

Renewable Technology	MCCCG Annual Rates	\$/MWh
	Solar PV	\$59.49
	AZ Wind	\$51.80
	Biomass	\$53.68
	NM Wind	\$52.09
	Solar CSP	\$61.40

# EXHIBIT

"4"

**CONFIDENTIAL**

EXHIBIT

"5"



# **Tucson Electric Power Company**

**2011**

## **Renewable Energy Credit Purchase Program**

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## **RECPP Basics for Distributed Generation Projects**

### **What is Distributed Generation?**

Distributed Generation (“DG”) refers to renewable energy projects that are on the customer side of the meter. This means that the generation does not “plug” directly into the grid, but it is consumed by the customer. Typically, these systems are customer owned, but other ownership models such as leasing, service contracts, or an Energy Service Company may be used.

### **What is Net Metering?**

Net Metering occurs when a Tucson Electric Power Company (“TEP”) customer installs a renewable energy electric generator, such as a photovoltaic system. These customers will be outfitted with a bi-directional meter and given a rate that allows them to collect a credit for the energy they “push” back onto the grid at their retail rate. Should the customer overproduce over the course of an entire year, the remaining credits are transitioned to a payment at the wholesale rate. Systems may not exceed 125% of connected load for that meter. Connected load is defined as maximum demand divided by 0.6. Customers should refer to the Arizona Corporation Commission (“Commission”) webpage for more information or to view the Net Metering Rules.

### **Why is TEP involved with DG?**

Like other utilities in Arizona, TEP is mandated by the Commission to replace a substantial portion of its retail sales with renewable energy. One way TEP does this is through the implementation of utility-scale and DG projects where TEP can purchase Renewable Energy Credits (“REC”). TEP does not own or build these systems, but incents them by purchasing the resulting RECs. One REC is equivalent to 1 kWh.

### **How does TEP get involved with DG?**

TEP provides up-front (“UFI”) and performance-based (“PBI”) DG incentives for qualifying renewable energy generators. TEP’s incentive programs include varying payments by technology; these payments are used to purchase the accompanying RECs. TEP uses the RECs it purchases to meet the Commission’s renewable energy mandates. The specific programs by qualifying technology type are described within this document. It is important to note that TEP’s payments for RECs are incentive payments for RECs, not rebates.

## **Application and Incentive Payment Process**

### **Residential and Small Non-Residential Projects – Up Front Incentives Only**

#### **Qualifying Technologies and Size Limits:**

- Residential solar PV less than 20 kW AC (28.4 kW DC)

- Residential hot water and space heating

- Residential and small non-residential ground source heat pumps up to 200 tons

- Wind systems less than 1 MW AC

- Small non-residential solar PV less than 50 kW AC (71 kW DC)

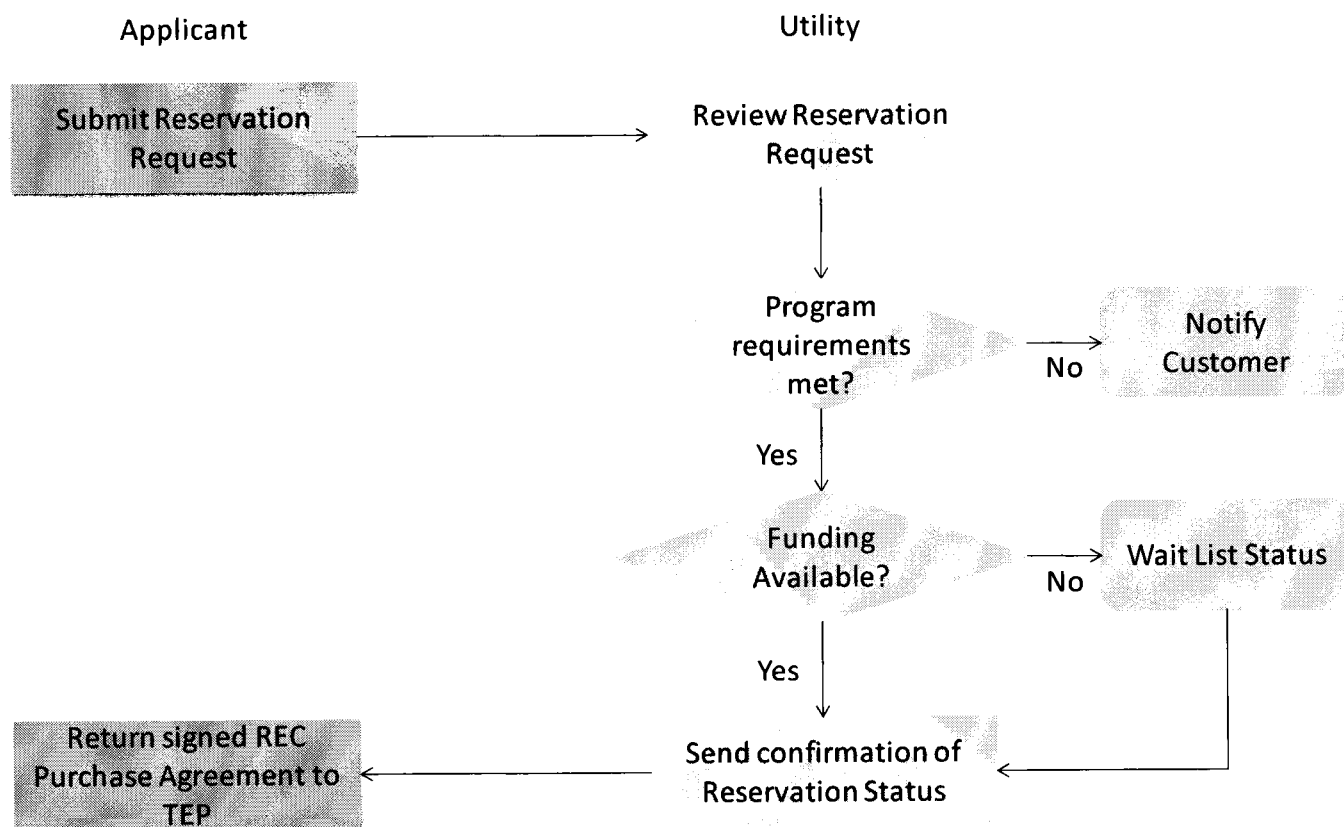
- Small non-residential hot water/space heating less than 400,000 kWh estimated savings annually

Non-residential daylighting  
Non-residential pool heating

## Application Process for UFI Payments

The process for obtaining up-front incentives from TEP requires information sharing between the applicant and TEP. The following sections reflect the typical three-step process.

### Step 1 – Reservation Request and Assignment of Reservation Status



The applicant must first submit the reservation request to TEP.<sup>1</sup> The reservation request includes (at minimum) information about the customer that owns the property where the system will be located, the renewable energy system, the calculation of the incentive, and the installer of the system.

TEP will review the reservation request to ensure the application conforms to program requirements.

- UFI Reservation requests are processed on a first-come, first-reserved basis.
- UFI Reservation requests will be reviewed within 30 days of the utility's receipt of the request.
- Reservation money may be set aside until the 4<sup>th</sup> quarter for technologies other than PV.

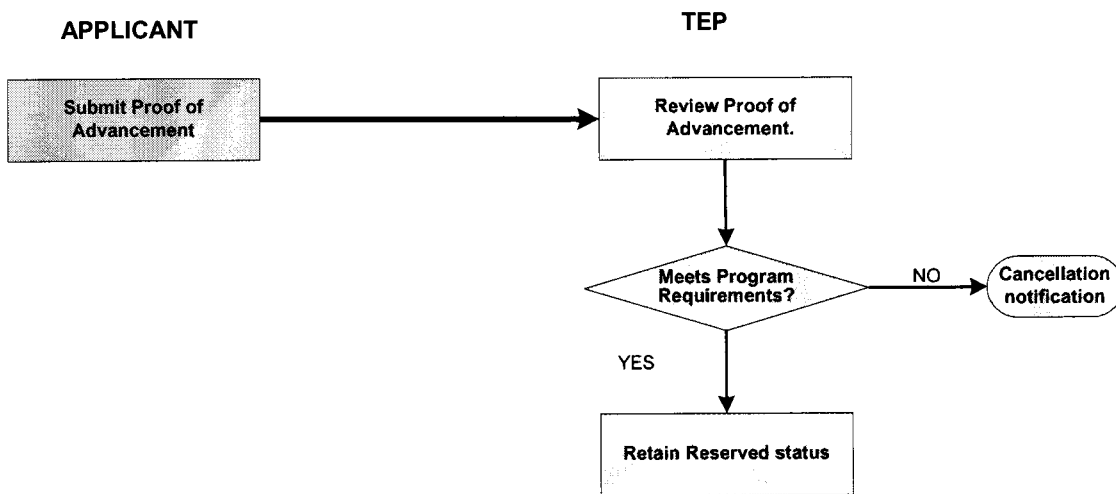
If the reservation request is approved, TEP will send confirmation to the applicant. If the request is not approved, TEP will notify the customer and include the reason for the denial. Typically, if denied, one or a combination of the following three reasons is the issue.

<sup>1</sup> Each technology has its own application available at [tep.com/green](http://tep.com/green).

1. The reservation request was not in compliance with program requirements (see specific sections below). In this case, TEP will notify the applicant of the discrepancies and put the reservation in "pending" status. The installer then has 14 days to bring the application in to compliance with program requirements.
2. The reservation request was not in conformance with program requirements. In this case, TEP will notify the customer that his or her request is cancelled.
3. The reservation request was denied because the program ran out of funding. In this case, TEP will notify the applicant and place his or her application on a waiting list.

After reviewing the reservation request, TEP will assign a reservation status.

## Step 2 – Proof of Advancement

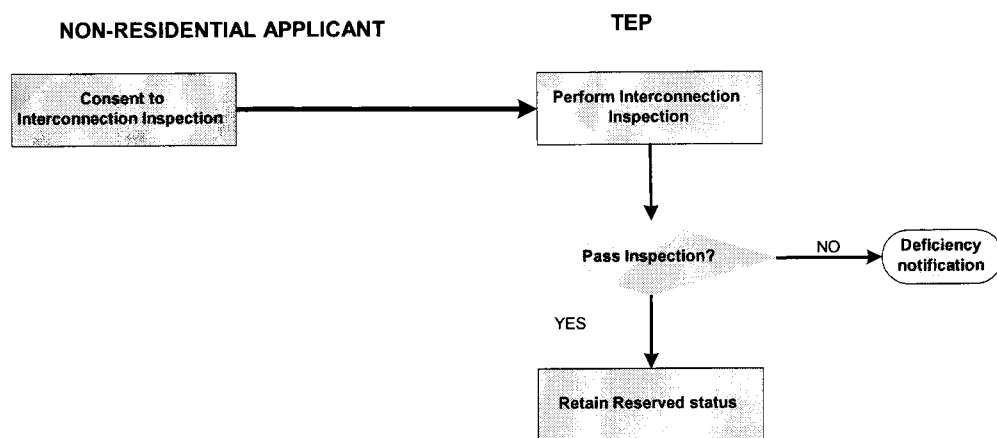


UFI applicants must submit proof of project advancement to TEP within 60 days of their reservation confirmation date, as assigned by TEP, in order to retain their reservation. UFI applicants must provide copies of all City and County Inspection Permits to TEP as part of the proof of project advancement documentation. Under certain circumstances, especially where the abovementioned permits are not available within 60 days of the date of reservation confirmation, the applicant may submit the following documents:

- signed agreement
- assignment of payment form
- City and County Permit application(s); and/or
- receipt of final acceptance inspection paperwork from the City and County.

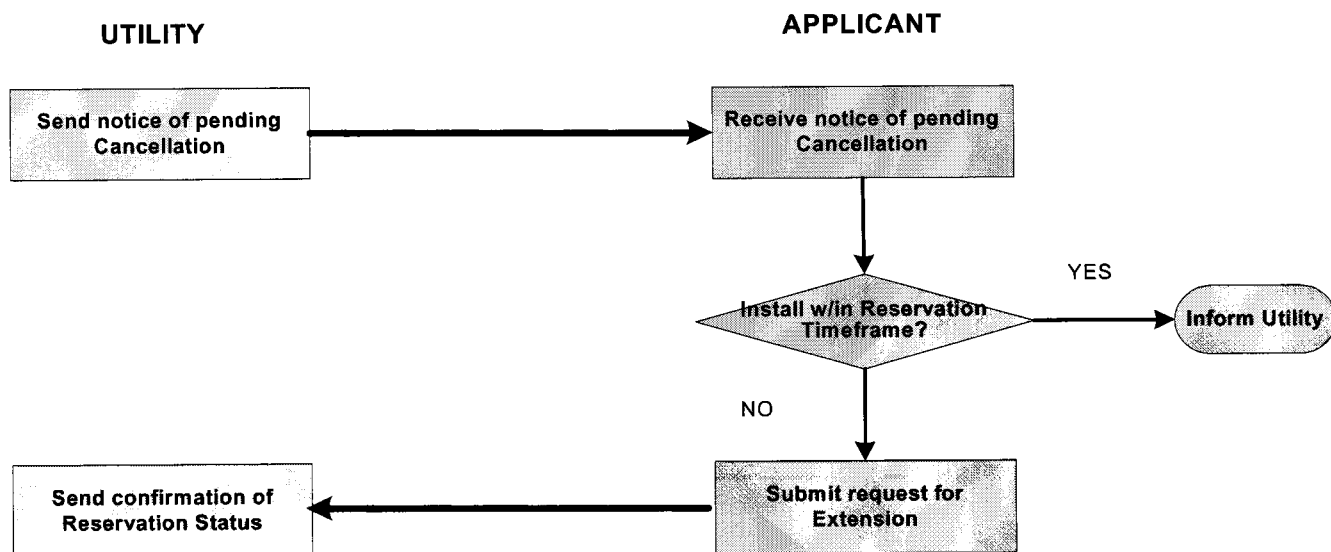
If proof of project advancement is not received within the specified timeframe, the applicant will be notified that his or her reservation is cancelled. The applicant can reapply for funding after cancellation, but the request will be treated like a new application and processed in the same manner as a new project reservation. Like all new applications, the reapplication will also be subject to availability of funding at the time the new application is received.

### Step 3 – Interconnection Inspection (for UFI Grid-Tied Renewable Electrical Systems Greater Than 20 kW AC (28.4 kW DC) such as PV)



Non-residential grid-tied qualifying systems of electrical generating capacity must submit to and pass an interconnection inspection before the system can be commissioned. TEP conducts the interconnection inspection and will notify the applicant of the results of the inspection. If the system passes the interconnection inspection, the applicant retains the reservation. An applicant may keep his or her reservation even if the system fails the initial interconnection inspection, provided that the deficiency is remedied within 30 days from the date of the reservation confirmation to TEP's satisfaction.

### Conditional Step – Extension / Cancellation

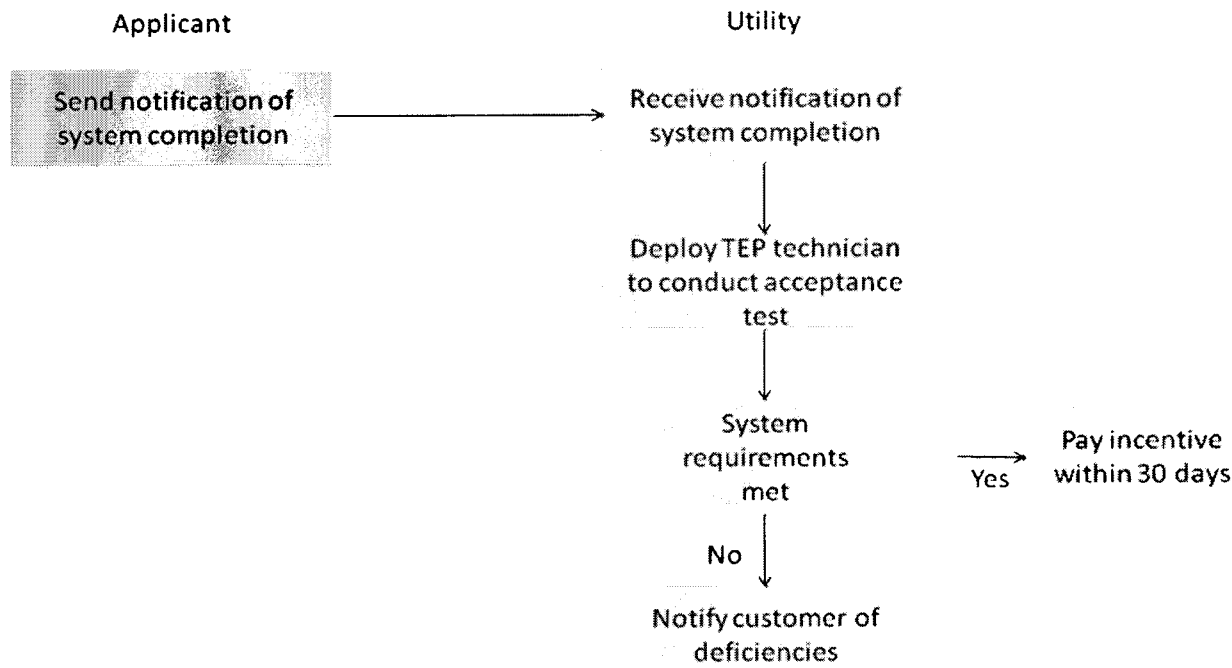


If all project requirements are not met within 180 days of the date of the reservation confirmation, the applicant must apply, in writing, for an extension to remain eligible for the incentive. A written request for an extension may be considered where the circumstances requiring a delay are detailed and TEP deems that an extension is warranted. TEP will trigger this request for extension with a notice of the pending cancellation 30 days prior to the date of scheduled cancellation. TEP may grant an extension of up to 90 days following timely receipt of a

customer's written request for an extension. Any written request for an extension must include a detailed description of the conditions causing the delay. Requests for extensions beyond the 90 day period will be considered on a case-by-case basis and will only be granted under extreme extenuating circumstances. Email may be used to request an extension.

If all program requirements have not been met within the reservation timeframe, the reservation request will be cancelled unless an extension is granted.

#### Step 4 – Customer Requests Payment



Upon project completion, the customer must notify TEP that the system has been placed in service. To do this the customer must submit a copy of all City and County Final Inspection Permit(s) to TEP. When TEP receives notification that the system is complete, TEP will perform an “acceptance test.” The acceptance test requires that a TEP inspector test the system’s compliance with the required specifications and its performance; this test will reveal whether the system is operating in-line with TEP’s requirements.

If the system meets TEP’s specifications and performance requirements, TEP will pay the customer the up-front incentive (“UFI”) within 30 days of the acceptance test. If the system fails to meet TEP’s specifications and performance requirements, TEP will notify the customer within 5 days of the acceptance test. The customer will then have 30 days to address the deficiencies and notify TEP that the system is ready to be retested.

## **Large Non-Residential Projects – Performance Based Incentives Only**

### **Qualifying Technologies and size limits:**

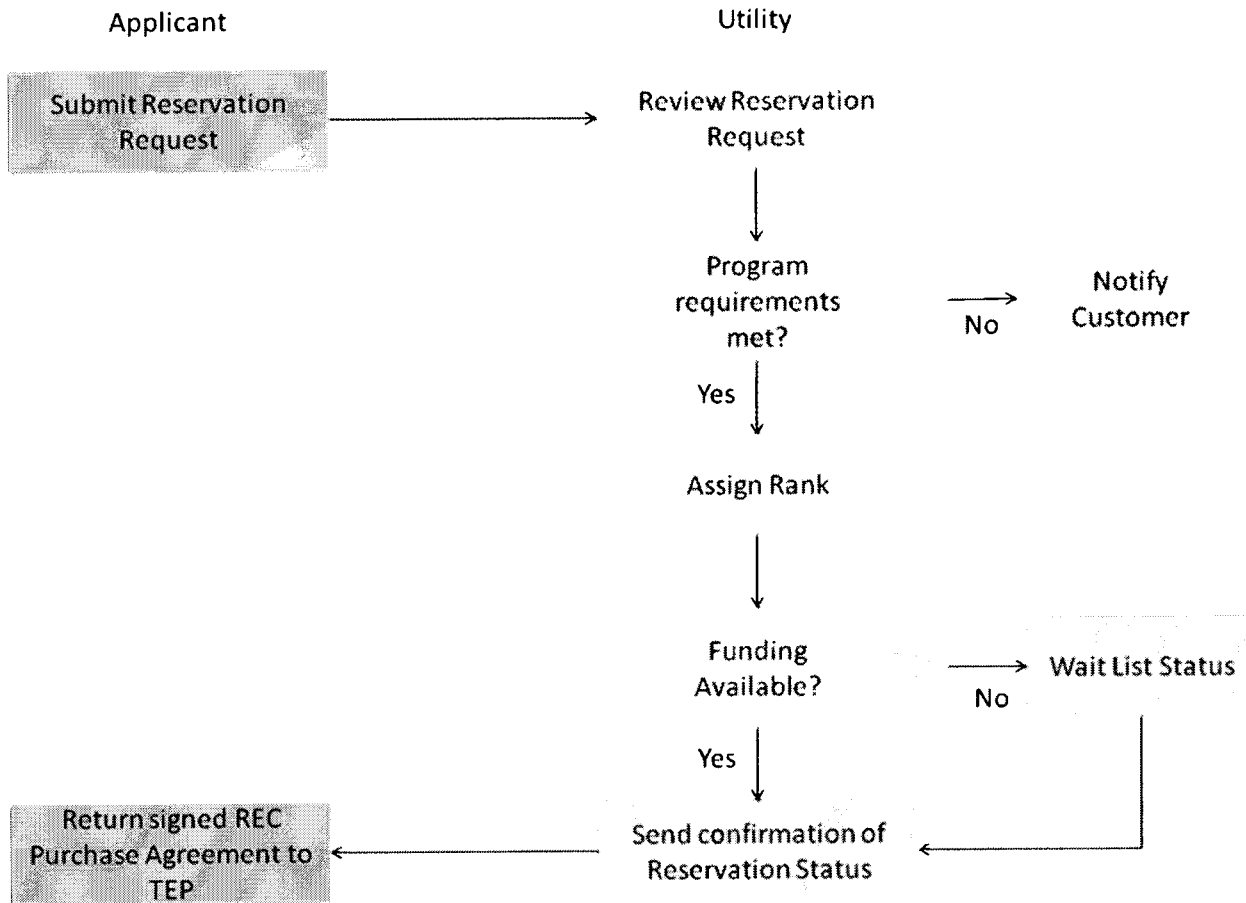
Non-Residential Solar PV greater than 50 kW AC (71 kW DC)  
Non-Residential Biomass/Biogas (Electric)  
Non-Residential Biomass/Biogas – CHP (Electric)  
Non-Residential Biomass/Biogas – CHP (Thermal)  
Non-Residential Biomass/Biogas (thermal)  
Non-Residential Biomass/Biogas (cooling)  
Non-Residential Geothermal – (electric)  
Non-Residential Geothermal – (thermal)  
Non-Residential Small Hydro  
Non-Residential Solar Space Cooling

### **Application Process for PBI Incentives**

The process for obtaining PBI incentives from TEP involves information sharing between the applicant and TEP. The following sections reflect the typical five-step process.

#### **Step 1 – Reservation Request and Assignment of Reservation Status**





The applicant must first submit the reservation request to TEP.<sup>2</sup> The reservation request must include (at minimum) information about the customer that owns the property where the system will be located, the renewable energy system, the calculation of the incentive, and the installer of the system.

TEP will review the reservation request within 90 days of receipt of the request to ensure the application conforms to program requirements.

- PBI Reservation requests for non-residential systems are assigned a rank based on the lowest expected life cycle Renewable Energy Credit purchase cost and likelihood of construction.
- In the event of a tie in the ranking, when the program would be fully subscribed if both projects were given reservation status, funds will be awarded based on the date of receipt of the completed reservation request.

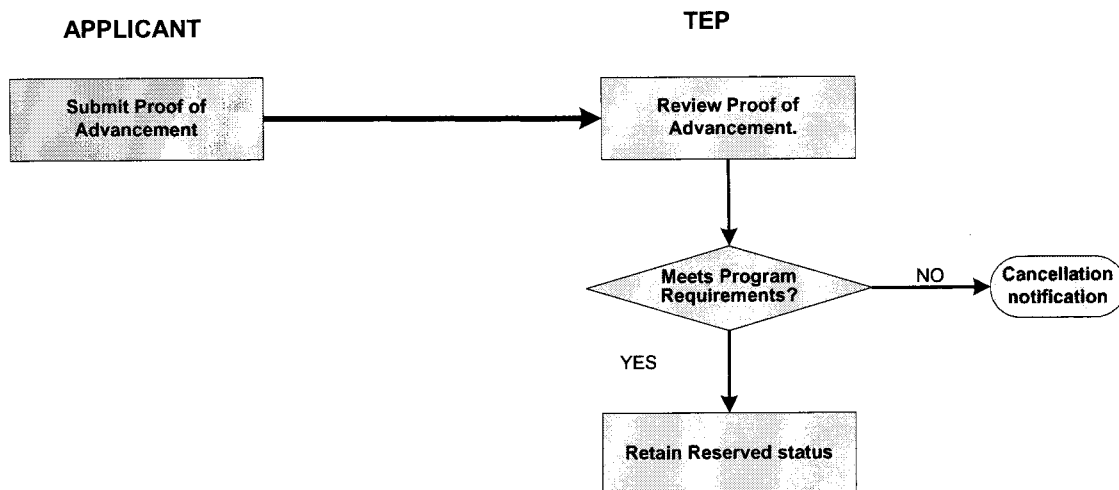
If the reservation request is approved, TEP will send confirmation to the applicant. Typically, if denied, one of the following reasons is the issue.

1. The reservation request was not in conformance with program requirements. In this case, TEP will send notice that the request is cancelled.
2. The reservation request was denied due to lack of program funding. In this case, TEP will send notice that the request will be placed on a waiting list.

<sup>2</sup> Applications for each technology are available at [tep.com/green](http://tep.com/green).

After reviewing the reservation request, TEP will assign a reservation status.

## Step 2 – Proof of Advancement

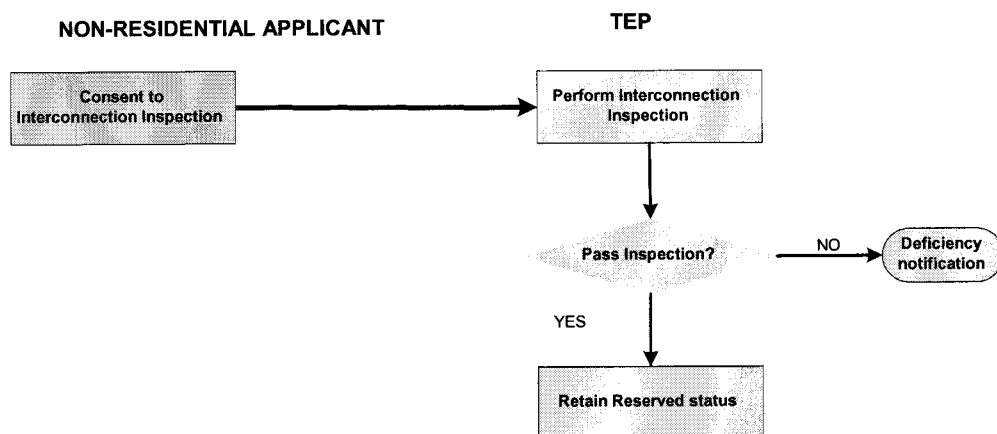


Applicants for non-residential PBI systems must submit proof of project advancement to TEP within 120 days of the date of reservation confirmation, as assigned by TEP, in order to retain their reservation. Proof of project advancement documentation may include the following:

- a project agreement (between customer and installer);
- an executed installation agreement including all project participants;
- building and/or construction permits and/or a full set of design development or construction drawings (80% or more complete);
- an executed interconnection agreement (if applicable); and/or
- a letter from customer committing to utility-accepted in-service date.

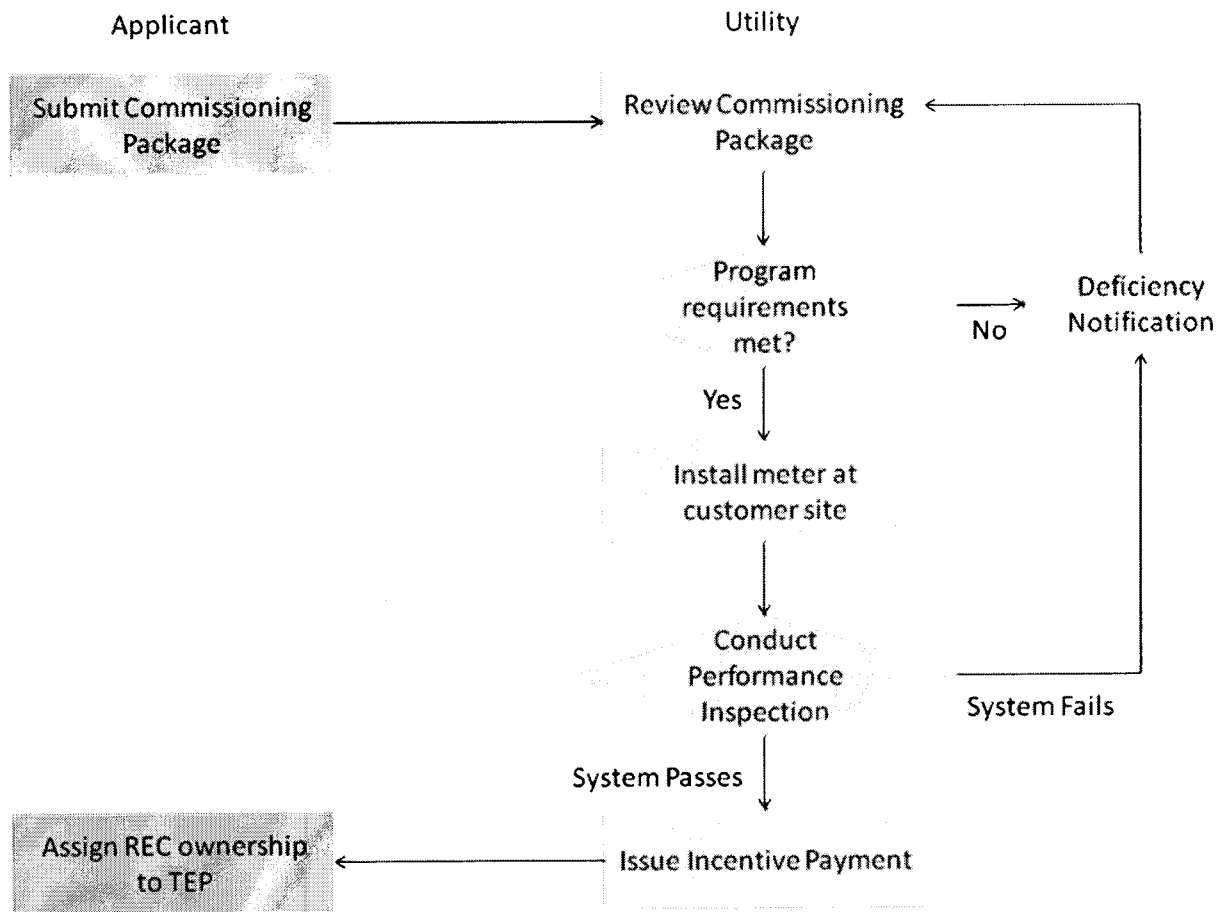
If proof of project advancement is not received within the specified timeframe, the customer will be notified that the reservation is cancelled. A written request for an extension may be considered where the circumstances requiring a delay are detailed and TEP deems that an extension is warranted. The applicant may reapply for funding after his or her reservation has been cancelled, but his or her reapplication will be treated as a new application and processed in the same manner as a new project reservation. Like all new applications, the reapplication will be subject to funding availability at the time the application is received. Email may be used to request an extension.

### Step 3 – Interconnection Inspection (for PBI Grid-Tied Renewable Electrical Systems such as PV)



Non-residential grid-tied qualifying systems of electrical generating capacity must submit to and pass a TEP-conducted interconnection inspection before the system can be commissioned. After conducting the inspection, TEP will notify the applicant of the inspection results. If the system passes the interconnection inspection, the applicant retains the reservation. The applicant may be able to keep his or her reservation even if the system fails the initial interconnection inspection, so long as the deficiency is remedied within 120 days from the date of the reservation confirmation, to TEP's satisfaction, as described in Step 2.

#### Step 4 – System Commissioning for Non-Residential PBI Systems



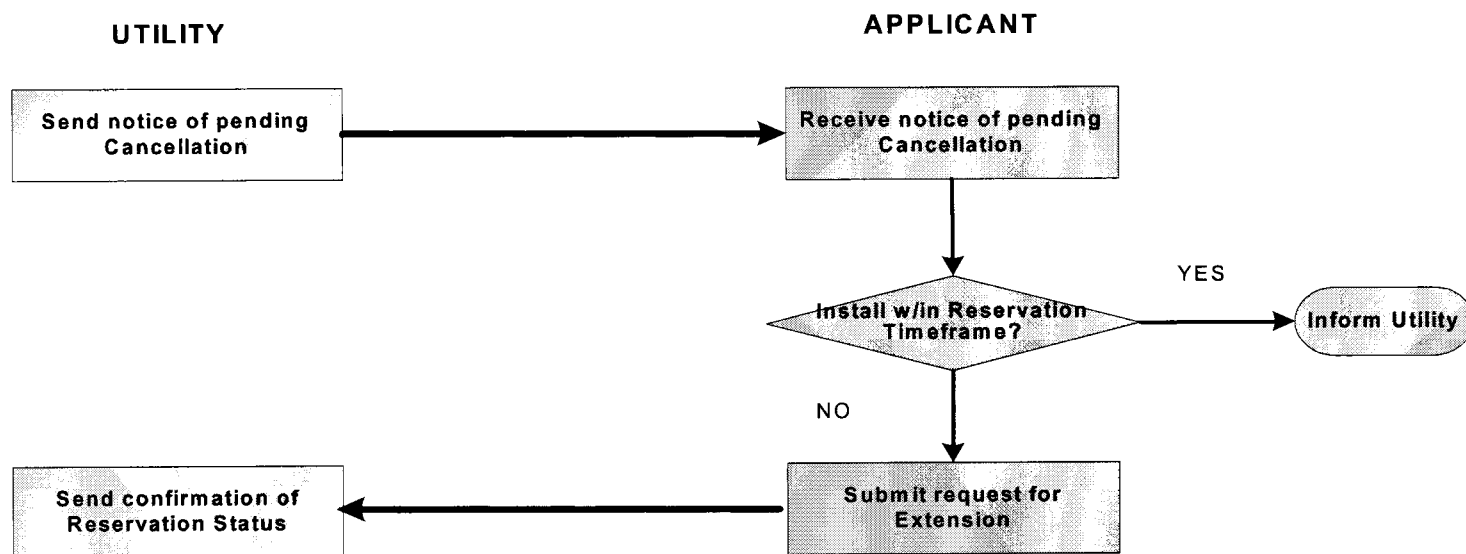
After the non-residential PBI system has been commissioned, the applicant must submit a commissioning package to TEP. TEP will review the commissioning package and confirm that all program requirements have been met, including passing the interconnection inspection (if applicable).

For electrical systems: after receiving the commissioning package, TEP will dispatch a TEP representative to install a meter at the system site. The meter will be certified according to TEP's standards. The customer must provide access to the site during normal business hours so that the TEP representative can install the meter.

For non-electrical systems: TEP may, where appropriate, allow the customer to install the meter. The determination will be made on a case-by-case basis according to the specific technology used and required.

In addition, TEP may, at its discretion, perform a conformance inspection of the system. TEP will notify the applicant of the scheduled conformance inspection and the applicant must make the system available for inspection. In most cases, an incentive payment will not be issued until the qualifying system has passed the conformance inspection.

## Conditional Step – Extension / Cancellation



If all project requirements are not met within 365 days of the date of the reservation confirmation, the applicant must apply for an extension to remain eligible for the incentive. TEP will trigger this request for extension with a notice of the pending cancellation 60 days prior to the date of scheduled cancellation. TEP will grant an extension for up to 90 days following timely receipt of a customer's request for extension. TEP may approve written extension requests detailing the conditions for delay for periods beyond 90 days under extenuating circumstances, or for systems larger than 1 MW.

If all program requirements have not been met within the reservation timeframe, a reservation request will be cancelled unless an extension is granted.

## Step 5 – Incentive Payment is Disbursed

All PBI Project Agreements will include the following terms:

1. A project agreement between the applicant(s) and TEP that details the assignment of energy and RECs, and the assignment of payment must be completed before payments can be disbursed.
2. At a minimum, quarterly meter reads will be performed by TEP and quarterly payments will be made to the assigned payee within 30 days of the meter reading based on quarterly kWh production. If the payment due is less than \$25.00, it will be held for the next payment period.
3. PBI payments will begin with the first quarterly production following receipt of the completed system commissioning package and conformance inspection, if required, and continue for the life of the agreement term. As part of this provision, it is understood that systems commissioned mid-quarter will receive payment only for the production of that partial quarter.

TEP's payment of a PBI will assure TEP complete and irrevocable ownership of the REC for the full duration of the PBI agreement. The agreement duration must fully coincide with the PBI payment schedule and the system must be supported by system warranty or planned maintenance schedules for the term of the agreement.

## **Community Solar Option**

TEP also offers the Community Solar Program. This Program is intended to be an alternative for TEP customers who do not wish to operate a distributed generation system, but still want to replace some or all of their electrical purchases with renewable energy.

### **What the RECPP Does NOT Do:**

This program does not accommodate non-customer sited projects for any reason. "Solar Farms" or other utility-scale generation projects do not qualify and should be referred to TEP's annual RFP for Renewable Energy. Information regarding this RFP may be found at: *tep.com*.

## **Solar Electric: Residential Projects 20 kW AC (28.4 kW DC) or Less and Non-Residential Projects 50 kW AC (71 kW DC) or Less**

### **INCENTIVE LEVELS FOR RESIDENTIAL SOLAR ELECTRIC SYSTEMS AND NON-RESIDENTIAL SYSTEMS 50 kW AC OR LESS**

Residential Solar Electric systems and Non-Residential Solar Electric systems 50 kW AC or less are eligible for UFIs. UFIs are those incentives where the customer receives a one-time payment based on the system's designed capacity.

Table 1 identifies the incentives available for Residential Solar Electric systems and Non-Residential Solar Electric systems 50 kW AC or less.

**Table 1. Up-Front Incentives (\$/Watt DC) for On-Grid Residential Smaller than 20 kW AC, On-Grid Non-Residential 50 kW AC or Less, and Off-Grid Solar Electric Systems**

YEAR	RESIDENTIAL	SMALL NON-RESIDENTIAL	OFF-GRID
2011	\$2.00	\$1.50	\$2.00

**Notes:**

- On-Grid Residential customers will receive a UFI up to a cap of 20 kW AC (28.4 kW DC). If a residential system is installed larger than 20 kW AC, TEP will only provide an incentive payment for the first 20 kW AC.
- On-Grid Small non-residential customers will receive a UFI up to a cap of 50 kW AC (71 kW DC). If a small non-residential system is installed larger than 50 kW AC, it must apply under the large non-residential program.
- Off-Grid customers, residential or non-residential, will receive a UFI up to a cap of 4 kW AC.
- The UFI may not exceed 60% of Total System Cost.
- The customer must pay at least 15% of the project cost, after other government incentives (e.g., tax credits) are considered. (See explanation of incentive calculation below.)
- Systems may not be eligible to receive RECPP incentives if other utility incentives are applied.
- As described later in this document, these incentive levels may be decreased because of sub-optimal system positioning.

The incentive amount will be calculated at the time the application is approved for reservation. If federal or state incentives change during the period of time after the reservation approval, the incentive amount reserved will not be changed as long as the reservation is not cancelled.

In return for TEP's payment of a UFI, TEP will be given complete and irrevocable ownership of the RECs until December 31<sup>st</sup> of the 20<sup>th</sup> full calendar year after completion of installation of the system. Operational life during that time frame must be supported by system warranty or planned maintenance schedules.

## **PROJECT FUNDING**

Funds will be made available for reservations on a first-come, first-reserved basis, until annual funding is fully reserved. Reservations which are rejected as a result of insufficient funds will be placed on a waiting list and offered the opportunity to retain their original reservation date for one additional quarter without the need to resubmit application documentation. If the incentive level has changed from the date of the original reservation to the date when the reservation is approved, the new incentive level shall be applied.

TEP, at the discretion of Program Managers, institute a REST compliance trigger to reduce incentive levels. This trigger would result in a decrease of incentive based on percentage met of annual REST compliance. The trigger is a mechanism to protect the industry by helping to ensure that money is still available for the duration of the year.

TEP will allocate funds to all qualifying technologies applying for residential and non-residential incentives. Non-PV categories may be protected from over spending in PV at the discretion of TEP Program Managers. This would most likely be a 10% carve out for technologies other than PV for both classes of projects.

## **NET METERING**

RECPP incentives can be applied to systems designed to serve only the typical load of the customer with whom the incentive agreement has been established. The assessment of that typical load does not preclude the periodic production of electricity in excess of the customer's demand. All projects must comply with Commission net metering rules.

## **PROJECT REQUIREMENTS AFTER INSTALLATION**

After completing the installation of a Residential Solar Electric project or Non-Residential Solar Electric project 50 kW AC or less, the customer must continue to provide information to TEP about the system's performance.

All customer systems receiving renewable energy self-generation incentives are obligated to include a TEP-supplied production meter, which will report system production to TEP in accordance with the regular meter-reading schedule. TEP, at its option, may perform periodic inspection of the system for operation, metered production, and reporting purposes.

## **THE FINE PRINT**

In addition to the other requirements described in this hand book, there are two other types of program details of which system owners and installers should be aware:

1. Installer qualifications
2. System removal

These are described in further detail below.



## **Installer Qualifications**

All systems receiving incentives under the RECPP must be installed by a qualified installer. The following requirements must be submitted by the applicant as part of the reservation request. TEP will verify that the installer meets the following minimum qualifications prior to confirming a reservation request:

1. The installer must possess a valid license on file with the Arizona Registrar of Contractors ("AZROC") with a license classification appropriate for the technology being installed. Alternatively, the installer must identify use of a contractor holding an appropriate license on file with the AZROC for the technology being installed. A copy of the AZROC license must be provided as part of the reservation request.
2. The installer must possess an Arizona business license that is active and in good standing.

Installers may request that the above information be retained on file with TEP; however, under this option the installer must certify that the information on file remains current with the submission of each reservation request. Information on file must be renewed yearly.

## **System Removal**

If receiving a UFI, neither the Qualifying System nor any components thereof shall be removed from the premises (by either the applicant or future owners or occupants of the property) until December 31<sup>st</sup> of the 20<sup>th</sup> full calendar year following completion of system installation of the renewable energy system, without express agreement of TEP. If the Qualifying System is removed by any party in violation of this provision, customer shall immediately reimburse TEP all incentive amounts paid by TEP to customer or on behalf of customer to an authorized third party.

In addition, if a Qualified System is removed, TEP shall monitor that specific customer site to ensure that an additional incentive is not provided for any new distributed renewable energy resource system on that site until the Renewable Energy Credit ("REC") contracted operational life of the original system has been completed.

**ATTACHMENT A**  
**System Qualifications for Residential Solar Electric Projects and**  
**Non-Residential Solar Electric Projects 50 kW AC or Less**

All solar electric generating Customer Systems must meet the following system and installation requirements to qualify for Tucson Electric Power Company's ("TEP" or the "Company") Renewable Energy Credit Purchase Program ("RECPP"). Capitalized terms not defined herein shall have the meanings ascribed to them in the RECPP Agreement.

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement, which is in conflict with a site-specific governmental requirement, shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

**Equipment Standards**

1. The Customer System components must be certified as meeting the requirements of IEEE-929 - Recommended Practice for Utility Interface of Photovoltaic Systems.<sup>3</sup>
2. Photovoltaic components must be certified by a nationally recognized testing laboratory as meeting the requirements of UL-1703 - Standard for Flat Plate Photovoltaic Modules and Panels Systems and be covered by a non-prorated manufacturer's warranty of at least 20 years.
3. The inverter must be certified as meeting the requirements of IEEE-1547 - Recommended Practice for Utility Interface of Photovoltaic Systems, and it must be UL-1741 certified. Inverters must be covered by a manufacturer's warranty of at least ten years.
4. The Customer System design and installation must meet all requirements of the latest edition of the National Electrical Code, including Article 690 and all grounding, conductor, raceway, over-current protection, disconnect and labeling requirements.
5. All other electrical components must be UL listed.

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<sup>3</sup> Some technology-specific criteria reference third party standards. The requirements of those standards are fully applicable when referenced as part of technology specific criteria. TEP recognizes that new standards are likely to develop in the near future for technologies included in the RECPP, and recommends that the new standards are examined for application in this program definition as they become available.

6. The Customer System and installation must meet the requirements of all federal, state and local building codes and have been successfully inspected by the building official having jurisdiction. Accordingly, the installation must be completed in accordance with the requirements of the latest edition of National Electrical Code in effect in the jurisdiction where the installation is being completed (NEC), including, without limitation, Sections 200-6, 210-6, 230-70, 240-3, 250-26, 250-50, 250-122, all of Article 690 pertaining to Solar Photovoltaic Systems, thereof, all as amended and superseded.
7. The Customer System must meet Company and Arizona Corporation Commission interconnection requirements for self-generation equipment.  
See <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf> for these requirements.

### **Installation requirements**

1. A grid-connected Residential Customer System must have a total solar array nameplate rating of at least 845 watts AC (1,200 watts DC) and no more than 20,000 watts AC (28,400 watts DC).
2. The Customer System installation must meet the TEP Service Requirements 2010 Edition, Page 1.20, as follows:  
  
“AN AC DISCONNECT MEANS SHALL BE PROVIDED ON ALL UNGROUNDED AC CONDUCTORS and SHALL CONSIST OF A LOCKABLE GANG OPERATED DISCONNECT CLEARLY INDICATING OPEN OR CLOSED. THE SWITCH SHALL BE VISUALLY INSPECTED TO DETERMINE THAT THE SWITCH IS OPEN. THE SWITCH SHALL BE CLEARLY LABELED STATING “DG SERVICE DISCONNECT.”
3. The utility meter and utility disconnect will be installed in a location readily accessible by TEP at all times.
4. Products must be installed according to manufacturers’ recommendations.
5. The Customer System photovoltaic panels and modules must face within +/- 100 degrees of true south, and be substantially unshaded from 9 am to 3 pm. System arrays which are facing at an azimuth angle of more than 20 degrees from true south or shaded for more than one hour per day will be subject to a reduced amount of buydown payment per Attachment B.
6. The Customer System photovoltaic panels and modules must be fitted at an angle of 0 degrees to 60 degrees from horizontal. System arrays which are fitted with an elevation angle of less than 20 degrees or more than 35 degrees above horizontal will be subject to a reduced amount of buydown payment per Attachment B.
7. For Residential Customer Systems, Company shall furnish a meter, meter socket, and AC disconnect switch in accordance with TEP SR-122 service requirements. Company shall install the meter. For Non-Residential customer systems, Company shall furnish and install the meter only. The meter socket and AC disconnect shall be installed in accordance with TEP SR-122 service requirements. Installer must notify TEP of wiring configuration so that Company may provide the appropriate 3-phase meter.

8. Total voltage drop on the DC and AC wiring from the furthest PV module to the AC meter will not exceed 2%.
9. PV panels and DC to AC inverter will be installed with sufficient clearance to allow for proper ventilation and cooling. At a minimum, manufacturer clearance recommendations will be observed. PV modules may be mounted less than 4 inches above any surface and an additional inch of clearance for each foot of continuous array surface area beyond four feet in the direction parallel to the mounting support surface, only in cases when arrays are flush-mounted to roof pitch. Otherwise, the four-inch spacing and an additional inch of clearance for each foot of continuous array surface area minimum is required.
10. Storage Batteries are not allowed as part of the Customer System unless the inverter is a separate component and TEP can locate the Solar Meter at the inverter's output. If configured otherwise, battery losses will adversely reflect in the annual AC metered energy output. Customer's solar energy generation and energy storage system must meet the requirements of 2 and 3 of this Attachment A.
11. The DC to AC inverter used must provide maximum power point tracking for the full voltage and current range expected from the photovoltaic panels used and the temperature and solar insolation conditions expected in Tucson, Arizona.
12. The DC to AC inverter must be capable of adjusting to "sun splash" from all possible combinations of cloud fringe effects without interruption of electric production.
13. TEP reserves the right to modify standards as technology changes on a case by case basis, pending independent laboratory analysis, Professional Engineer ("PE") stamp, or TEP engineering analysis.

#### **General Requirements**

1. All Customer System installations must be completed in a professional, workmanlike and safe manner.
2. Installation must have been made after January 1, 1997.
3. The Customer must be connected to the Company's electric grid, except for approved off-grid systems in conformance with the RECPP.
4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.
5. The project must comply with applicable local, state, and federal regulations.
6. Products must be installed according to manufacturers' recommendations.
7. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
8. All major system components must be new and must not have been previously placed in service in any other location or for any other application.

9. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems will require customer supplied metering for Performance Based Incentive ("PBI") payment calculation purposes.
10. PV system components shall be properly labeled, including AC & DC disconnects (if present), solar generation meter, service panel (outside cover), and breakers inside the service panel.
11. The system will in all cases have a material and full labor warranty of at least five years.

#### **Additional Requirements for Off-Grid Systems**

1. The minimum Solar Electric array size shall be no less than 422 watts AC (600 watts DC). The maximum Solar Electric array size for customers currently paying into the REST tariff shall not exceed 4,000 watts AC (5,680 watts DC). For customers not currently paying into the REST tariff, systems shall not exceed 2,000 watts AC (2,840 watts DC).
2. Off-grid systems will not be metered. Compliance reporting production will be based on an annual 20% capacity factor using nameplate DC rating for capacity.

# **ATTACHMENT B** **SunShare Solar Electric Off-Angle & Shading Annual Energy Derating Chart**

SunShare PV Off-Angle & Shading Annual Energy Derating Chart															
Array Angle above Horizontal	Revised 04/14/2008														Array Angle above Horizontal
	Array Azimuth Angle from Due South														
	EAST							SOUTH						WEST	
	100	80	60	40	20	20	40	60	80	100					
0		80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	80%	0
10		80%	80%	85%	85%	85%	85%	80%	80%	80%	80%	80%	80%	80%	10
15		90%	90%	95%	95%	95%	95%	90%	90%	90%	85%	85%	85%	85%	15
20		85%	90%	95%	95%	95%	95%	90%	90%	90%	85%	85%	85%	85%	20
25		85%	90%	95%	95%	95%	95%	90%	85%	80%	75%	75%	75%	75%	25
30		80%	85%	90%	95%	95%	95%	90%	80%	75%	70%	70%	70%	70%	30
35		75%	85%	90%	95%	95%	95%	90%	85%	80%	70%	70%	70%	70%	35
40		75%	85%	90%	95%	95%	95%	90%	85%	75%	70%	70%	70%	70%	40
45		70%	80%	85%	95%	95%	95%	90%	80%	75%	70%	70%	70%	70%	45
50		70%	80%	85%	90%	90%	85%	80%	70%	70%	70%	70%	70%	70%	50
55		65%	75%	80%	90%	90%	85%	75%	70%	70%	70%	70%	70%	70%	55
60		60%	70%	80%	90%	90%	85%	75%	70%	70%	70%	70%	70%	70%	60
	100	80	60	40	20	20	40	60	80	100					
Array Angle above Horizontal	Array Azimuth Angle from Due South														Array Angle above Horizontal
	EAST							SOUTH						WEST	
	If both off angle and shading conditions apply, multiply the off angle derating factor with the shading derating factor to obtain the array derating factor for the SunShare payment calculation.														
	Maximum Morning Shaded Hours			1	0	2	1	2	2	0	3	1	3		
	Maximum Evening Shaded Hours			1	2	0	2	1	2	3	0	3	1		
	Percentage of Annual Energy =			90%	90%	85%	85%	75%	75%	70%	70%	70%			

Qualifying systems using Building Integrated Photovoltaic (BIPV) modules of total array capacity of 5 kW DC or less shall receive 90% of the UFI incentive value for PV systems listed in Attachment A. Systems using BIPV modules of total array capacity of greater than 5 kW DC shall be derated based on heating unless the applicant can demonstrate optimal performance.

## Solar Electric: Non-Residential Projects Greater than 50 kW AC (71 kW DC)

### INCENTIVE LEVELS FOR NON-RESIDENTIAL SOLAR ELECTRIC SYSTEMS GREATER THAN 50 kW AC

Non-residential Solar Electric systems greater than 50 kW AC are eligible for performance-based incentives ("PBIs"). The PBI allows the customer to collect incentive payments in direct relation to the actual system production. Table 2 identifies the incentives available for non-residential Solar Electric systems larger than 50 kW AC.

In all cases, incentive values listed in Table 2 are maximum values. PBIs are awarded through a bid process, which is discussed later in this section. Applicants are encouraged to submit bids requesting incentive amounts less than the maximums listed. Bids requesting a lower level of incentive payment than the maximum will have an increased chance of acceptance in the allocation ranking process.

**Table 2. Maximum Performance-Based Incentives for Non-Residential Projects Greater Than 50 kW AC (71 kW DC)**

*Maximum* Incentive Levels for Specified REC Agreements of Specified Duration

<b>51 – 500 kW AC (143 – 710 kW DC)</b>			
<b>YEAR</b>	<b>10-YEAR</b>	<b>15-YEAR</b>	<b>20-YEAR</b>
2011	\$0.142	\$0.142	\$0.142
<b>501 – 1000 kW AC (714 – 1,420 kW DC)</b>			
<b>YEAR</b>	<b>10-YEAR</b>	<b>15-YEAR</b>	<b>20-YEAR</b>
2011	\$0.122	\$0.122	\$0.122
<b>GREATER THAN 1,000 kW AC (1,420 kW DC)</b>			
<b>YEAR</b>	<b>10-YEAR</b>	<b>15-YEAR</b>	<b>20-YEAR</b>
2011	\$0.102	\$0.102	\$0.102
<b>Notes:</b> <ul style="list-style-type: none"> <li>• There is no incentive cap for non-residential systems other than program funding considerations.</li> <li>• A PBI cannot exceed 60% of the real project costs, defined as the undiscounted total system cost plus acceptable financing charges. Acceptable finance charges are finance charges used for the PBI incentive cap calculation and cannot exceed the current prime interest rate plus 5%. Financing charges must be disclosed as part of the commissioning package, if not disclosed before.</li> <li>• The customer must pay at least 15% of the project cost (as defined above), after other government incentives (e.g., tax credits) are considered. (See explanation of incentive calculation below.)</li> <li>• Systems may not be eligible to receive RECPP incentives if other utility incentives are applied.</li> </ul>			

The incentive amount will be calculated at the time the application is approved for reservation. If federal or state incentives change during the period of time after the reservation approval, the incentive amount reserved will not be changed as long as the reservation is not cancelled.

TEP's payment of a PBI will assure TEP complete and irrevocable ownership of the REC for the full duration of the PBI agreement. The agreement duration must fully coincide with the PBI payment schedule and the system must be supported by system warranty or planned maintenance schedules for the term of the agreement. It is possible to request a shorter-than-20 year term and still give a 20 or greater year REC commitment. This may help position the project bid in a more competitive manner.

## **PROJECT FUNDING**

Non-residential funds will be committed as bids are accepted; funds may be placed in reserve for later in the year. As a result, the budget may be committed before the end of the year. Funds will be made available to projects based on a ranking generated by lowest expected life cycle credit purchase cost, as provided in the application and verified by TEP, as well as likelihood of construction. Projects submitted to the utility for reservation will be ranked based on a calculated index value for purposes of allocating non-residential funds as proposed in the application and verified by TEP. Lowest lifecycle cost projects will be funded first. Indexing of the non-residential projects will be performed based on the verified incentive values and duration of the proposed agreement in the application for that project. In addition, the bid evaluator assesses the likelihood that the project will be completed. Projects with higher incentive payments result in a higher expected life cycle credit purchase cost and projects that produce more kWh result in a lower expected life cycle credit purchase cost. In the event of a tie in the ranking, when the program would be fully subscribed if both projects were given reservation status, funds will be awarded based on the date of receipt of the completed reservation request.

Reservation requests will reviewed by the utility on a monthly basis. Once reservation requests are fully ranked each month, notification of reservation approvals and rejections will be made in conformance with the rankings and available funding.

Reservations which are rejected as a result of insufficient program funds may elect to carry forward into the next period and retain the original reservation date. The election must be made at the time of the original application.

## **NET METERING**

RECPP incentives can be applied to systems designed to serve only the typical load of the customer with whom the incentive agreement has been established. The assessment of that typical load does not preclude the periodic production of electricity in excess of the customer's demand. All projects must comply with Commission net metering rules.

## **PROJECT REQUIREMENTS AFTER INSTALLATION**

All customer systems receiving renewable energy self-generation incentives are obligated to include a TEP-supplied production meter, which will report system production to TEP in accordance with the regular meter-reading schedule. TEP, at its option, may perform periodic inspection of the system for operation, metered production, and reporting purposes.



## **THE FINE PRINT**

In addition to the other requirements described in this hand book, there are two other types of program details of which system owners and installers should be aware:

1. Installer qualifications
2. System removal

These are described in further detail below.

### **Installer Qualifications**

All systems receiving incentives under the RECPP must be installed by a qualified installer. The following requirements must be submitted by the applicant as part of the reservation request. TEP will verify that the installer meets the following minimum qualifications prior to confirming a reservation request:

1. The installer must possess a valid license on file with the Arizona Registrar of Contractors ("AZROC") with a license classification appropriate for the technology being installed. Alternatively, the installer must identify use of a contractor holding an appropriate license on file with the AZROC for the technology being installed. A copy of the AZROC license must be provided as part of the reservation request.
2. The installer must possess an Arizona business license that is active and in good standing.

Installers may request that the above information be retained on file with TEP; however, under this option the installer must certify that the information on file remains current with the submission of each reservation request. Information on file must be renewed yearly.

### **System Removal**

If receiving a PBI, the Qualifying System or any components thereof shall not be removed from the premises until the last day of the final month of the final full calendar year of the applicable incentive payment term in the Agreement following completion of system installation of the renewable energy system, without express agreement from TEP. If the Qualifying System is removed in violation of this provision, customer shall immediately reimburse TEP all incentive amounts paid by TEP to customer or on behalf of customer to an authorized third party.

In addition, if a Qualified System is removed, TEP shall monitor that specific customer site to ensure that an additional incentive is not provided for any new distributed renewable energy resource system on that site until the REC contracted operational life of the original system has been completed.

TEP shall attempt to monitor the number of missing or non-working distributed generation systems and shall summarize its observations in its annual Compliance Report.

## **ATTACHMENT A**

### **Qualifications for Non-Residential Solar Electric Systems Greater Than 50 kW AC**

All solar electric generating Customer Systems must meet the following system and installation requirements at the time of project commissioning to qualify for Tucson Electric Power Company's ("TEP" or the "Company") Renewable Energy Credit Purchase Program ("RECPP"). Capitalized terms not defined herein shall have the meanings ascribed to them in the RECPP Agreement.

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement which is in conflict with a site-specific governmental requirement shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

#### **Equipment Standards**

1. The Customer System components must be certified as meeting the requirements of IEEE-929 - Recommended Practice for Utility Interface of Photovoltaic Systems.<sup>4</sup>
2. Photovoltaic components must be certified by a nationally-recognized testing laboratory as meeting the requirements of UL-1703 - Standard for Flat Plate Photovoltaic Modules and Panels Systems; they must also be covered by a non-prorated manufacturer's warranty of at least 20 years.
3. The Customer System design and installation must meet all requirements of the latest edition of the National Electrical Code, including Article 690 and all grounding, conductor, raceway, over-current protection, disconnect and labeling requirements.
4. The inverter must be certified as meeting the requirements of IEEE-1547 - Recommended Practice for Utility Interface of Photovoltaic Systems and it must be UL-1741 certified. Inverters must be covered by a manufacturer's warranty of at least ten years.
5. All other electrical components must be UL listed.

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<sup>4</sup> Some technology-specific criteria reference third party standards. The requirements of those standards are fully applicable when referenced as part of technology specific criteria. TEP recognizes that new standards are likely to develop in the near future for technologies included in the RECPP and recommends that the new standards are examined for application in this program definition as they become available.

6. The Customer System and installation must meet the requirements of all federal, state and local building codes and have been successfully inspected by the building official having jurisdiction. Accordingly, the installation must be completed in accordance with the requirements of the latest edition of National Electrical Code in effect in the jurisdiction where the installation is being completed (NEC), including, without limitation, Sections 200-6, 210-6, 230-70, 240-3, 250-26, 250-50, 250-122, all of Article 690 pertaining to Solar Photovoltaic Systems, thereof, all as amended and superseded.
7. The Customer System must meet Company and Arizona Corporation Commission interconnection requirements for self-generation equipment.  
See <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf> for these requirements.

### **Installation requirements**

1. Any Non-Residential Customer System must have a total solar array nameplate rating of more than 1,200 watts DC.
2. The Customer System installation must meet the TEP Service Requirements 2010 Edition, Page 1.20, as follows:  
  
“AN AC DISCONNECT MEANS SHALL BE PROVIDED ON ALL UNGROUNDED AC CONDUCTORS and SHALL CONSIST OF A LOCKABLE GANG OPERATED DISCONNECT CLEARLY INDICATING OPEN OR CLOSED. THE SWITCH SHALL BE VISUALLY INSPECTED TO DETERMINE THAT THE SWITCH IS OPEN. THE SWITCH SHALL BE CLEARLY LABELED STATING “DG SERVICE DISCONNECT.”
3. The utility meter and utility disconnect will be installed in a location readily accessible by TEP at all times.
4. Products must be installed according to manufacturers’ recommendations.
5. For Non-Residential Customer Systems, Company shall provide the meter only, to be installed in a Customer supplied meter socket to be installed in a readily accessible outdoor location by the Customer between the DC to AC inverter and the connection to the over-current device in the Customer’s electric service panel.
6. Total voltage drop on the DC and AC wiring from the furthest PV module to the AC meter will not exceed 2%.
7. PV panels and DC to AC inverter will be installed with sufficient clearance to allow for proper ventilation and cooling. At a minimum, manufacturer clearance recommendations will be observed. PV modules may be mounted less than 4 inches above any surface and an additional inch of clearance for each foot of continuous array surface area beyond four feet in the direction parallel to the mounting support surface only in cases when arrays are flush-mounted to roof pitch. Otherwise, the four-inch spacing and an additional inch of clearance for each foot of continuous array surface area minimum is required.
8. Storage Batteries are not allowed as part of the Customer System unless the inverter is a separate component and TEP can locate the Solar Meter at the inverter’s output. If configured otherwise, battery losses will

adversely reflect in the annual AC metered energy output. Customer's solar energy generation and energy storage system must meet the requirements of 1 and 2 under "Equipment Standards" of this Attachment A.

9. The DC to AC inverter used must provide maximum power point tracking for the full voltage and current range expected from the photovoltaic panels used and the temperature and solar insolation conditions expected in Tucson, Arizona.
10. The DC to AC inverter must be capable of adjusting to "sun splash" from all possible combinations of cloud fringe effects without interruption of electric production.

### **General Requirements**

1. All Customer System installations must be completed in a professional, workmanlike and safe manner.
  2. Installation must have been made after January 1, 1997.
  3. The Customer must be connected to the Company's electric grid, except for approved off-grid systems in conformance with the RECPP.
  4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.
  5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.
  6. The project must comply with applicable local, state, and federal regulations.
  7. Products must be installed according to manufacturers' recommendations.
  8. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
  9. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.
  10. PV system components shall be properly labeled, including AC & DC disconnects (if present), solar generation meter, service panel (outside cover), and breakers inside the service panel.
  11. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment.  
See <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf> for these requirements.
  12. The system will in all cases have a material and full labor warranty of at least five years.
- Requirements Specific to Non-Residential PV Systems Greater Than 50 kW AC**

1. The Non-Residential Customer System shall be operating, substantially complete and have produced an AC output at least 70% of the total array nameplate DC rating at PTC .<sup>5</sup>
2. Operation, Maintenance and Repair. The Customer shall be solely responsible for the operation, maintenance and repair of the Non-Residential Customer System and any and all costs and expenses associated therewith. Company will notify Customer of all Non-Residential Customer System repairs the Company determines are reasonably necessary to support proper continued electrical production of the Non-Residential Customer System. The Customer will notify the Company within five (5) business days of its receipt of any such Company repair notice if the repair requires the installation of a new inverter and/or PV module. The Customer shall complete any such repair that affects the Non-Residential Customer System performance and does not require the purchase of a new inverter or PV module(s) within five (5) business days of the Company's notice of the need for such repair. For any such repair that does require the purchase and installation of a new inverter and/or PV module, the Customer shall promptly commence and diligently pursue such repair to completion, provided, in no event shall such repair take more than thirty (30) days to complete. At all times while Company is receiving the environmental credits from the Non-Residential Customer System, Customer shall clean all PV modules in the Non-Residential Customer System as necessary to keep them free from foreign material that would visibly obscure the modules, including any dirt and/or oils.
3. Non-Residential Customer System Security. At all times during and after installation of the Non-Residential Customer System, the Customer shall use commercially reasonable efforts to provide adequate security to prevent damage or vandalism to the Non-Residential Customer System.
4. Company shall provide Customer with a revenue grade AC meter to be installed between the Non-Residential Customer System and the grid interconnection. This meter will not be used for billing, but shall be used for any official Non-Residential Customer System production output data. Company will retain ownership of the meter and be responsible for its repair if needed.
5. Customer shall provide Company with all documentation reasonably requested by Company to demonstrate to the Commission that any environmental credits transferred under the Agreement were derived from an eligible technology, that the kWh generated are accurately reported and that the environmental credits have not expired or been used by any other entity for any purpose.
6. If certified proof cannot be provided of complete galvanic isolation of any and all DC from the AC output of the inverter(s) used in the Non-Residential Customer System through IEEE-1547 certification of the inverter, the Non-Residential Customer System shall include an isolation transformer installed between the inverter(s) and the grid interconnection. The transformer will be rated at full load continuous operation at 50 degrees C. at 125% of nameplate DC array rating and have an efficiency rating at nameplate DC array rating power of at least 98% as tested. The transformer will have at least one tap each of 2.5% and 5% both above and below the nominal voltage tap.

### **Additional Requirements for Off-Grid Systems**

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<sup>5</sup> PTC stands for "PVUSA Test Conditions." These standards are also referenced by the California Energy Commission. PTC conditions are based upon 1,000 W/m<sup>2</sup> solar irradiance, 20 degrees Celsius ambient temperature, and 1 m/s wind speed.

1. The minimum Solar Electric array size shall be no less than 422 watts AC (600 watts DC). For customers currently paying into the REST tariff the maximum Solar Electric array size shall not exceed 4,000 watts AC (5,680 watts DC). For customers currently not paying into the REST tariff, the maximum Solar Electric array size shall not exceed 2,000 watts AC (2,840 watts DC).
2. Off-grid systems will not be metered. Compliance reporting production will be based on an annual 20% capacity factor using nameplate DC rating for capacity.

## Residential and Non-Residential Solar Water Heating and Space Heating 400,000 kWh Equivalent Annual Production per Year or Less, Non-Residential Solar Pool Heating

### INCENTIVE LEVELS FOR RESIDENTIAL AND SMALL NON-RESIDENTIAL SOLAR WATER HEATING AND SPACE HEATING SYSTEMS, NON-RESIDENTIAL SOLAR POOL HEATING

Solar water heating and space heating in residential and small non-residential and non-residential solar pool heating applications are eligible for up-front incentives ("UFIs"). UFIs are those incentives where the customer receives a one-time payment based on the system's designed capacity. Table 3 identifies the incentives available for residential and small non-residential solar water heating and space heating systems.

**Table 3. Incentives for Residential and Non-Residential Solar Water Heating and Space Heating**

Year	Residential Incentive Level**	Non-Residential Incentive Level**
2011	\$750 plus \$0.25/kWh (max \$1,750)	\$750 plus \$0.50/kWh (max \$200,750)
<p>Notes:</p> <p>**Indicates estimated annual kWh production in first year.</p> <p># Energy savings rating is based on the SRCC OG-300 published rating or the TEP design analysis. Rate applies to forecast/measured first year energy savings only.</p> <ul style="list-style-type: none"> <li>Non-residential customers will receive a UFI up to a collector system size with output smaller than a 400,000 kWh equivalent. If a small non-residential system is installed beyond that threshold, it must apply under the large non-residential program.</li> <li>The UFI may not exceed 60% of total System Cost.</li> <li>The customer must pay at least 15% of the project cost, after other government incentives (e.g., tax credits) are considered. (See explanation of incentive calculation below.)</li> <li>Systems may not be eligible to receive RECPP incentives if other utility incentives are applied.</li> <li>The bid evaluator reserves the right to award incentives to solar thermal projects other than those that meet the specifications outlined in Attachment A. In these cases, the system output must be less than or equivalent to 400,000 kWh per year. Incentives in these cases will be determined by the bid evaluator.</li> <li>The process for determining annual kWh savings for non-residential solar pool heaters is this: <ol style="list-style-type: none"> <li>Determine whether or not the system has an OG-100 rating. If it does not, it is not eligible for the program.</li> <li>If it does have an OG-100 rating, find an OG-300 rating for comparable set of collectors.</li> <li>Use Tucson data to find rated annual heat production for domestic water. (This calculation assumes 300 days on which useful heat is produced.)</li> <li>Multiply the annual savings determined by the OG-300 rating by (180/300). This adjustment reflects the fact that pool heaters in Tucson realistically only produce useful heat on 180 days each year.</li> <li>The result is anticipated annual kWh savings for the unit. This is multiplied by PBI level to calculate annual incentive. TEP will retain the right to meter the system.</li> </ol> </li> </ul>		

The incentive amount will be calculated at the time the application is approved for reservation. If federal or state incentives change during the period of time after the reservation approval, the incentive amount reserved will not be changed as long as the reservation is not cancelled.

In return for TEP's payment of a UFI, TEP will be given complete and irrevocable ownership of the RECs until December 31<sup>st</sup> of the 20<sup>th</sup> full calendar year after completion of installation of the system. Operational life during that time frame must be supported by system warranty or planned maintenance schedules.

## **PROJECT FUNDING**

Funds will be made available for reservations on a first-come, first-reserved basis, until annual funding is reserved. Reservations which are rejected as a result of insufficient funds will be placed on a waiting list and offered the opportunity to retain their original reservation date for one additional quarter without the need to resubmit application documentation. If the incentive level has changed from the date of the original reservation to the date when the reservation is approved, the new incentive level shall be applied.

TEP will allocate funds to all qualifying technologies applying for residential and non-residential incentives. Non-PV categories may be protected from over spending in PV at the discretion of TEP Program Managers. This would most likely be a 10% carve out for technologies other than PV for both classes of projects.

## **THE FINE PRINT**

In addition to the other requirements described in this hand book, there are two other types of program details of which system owners and installers should be aware:

1. Installer qualifications
2. System removal

These are described in further detail below.

### **Installer Qualifications**

All systems receiving incentives under the RECPP must be installed by a qualified installer. The following requirements must be submitted by the applicant as part of the reservation request. TEP will verify that the installer meets the following minimum qualifications prior to confirming a reservation request:

1. The installer must possess a valid license on file with the Arizona Registrar of Contractors ("AZROC") with a license classification appropriate for the technology being installed. Alternatively, the installer must identify use of a contractor holding an appropriate license on file with the AZROC for the technology being installed. A copy of the AZROC license must be provided as part of the reservation request.
2. The installer must possess an Arizona business license that is active and in good standing.

Installers may request that the above information be retained on file with TEP; however, under this option the installer must certify that the information on file remains current with the submission of each reservation request. Information on file must be renewed yearly.



## **System Removal**

If receiving a UFI, neither the Qualifying System nor any components thereof shall be removed from the premises (by either the applicant or future owners or occupants of the property) until December 31<sup>st</sup> of the 20<sup>th</sup> full calendar year following completion of system installation of the renewable energy system, without express agreement of TEP. If the Qualifying System is removed by any party in violation of this provision, customer shall immediately reimburse TEP all incentive amounts paid by TEP to customer or on behalf of customer to an authorized third party.

In addition, if a Qualified System is removed, TEP shall monitor that specific customer site to ensure that an additional incentive is not provided for any new distributed renewable energy resource system on that site until the REC contracted operational life of the original system has been completed.

TEP shall attempt to monitor the number of missing or non-working distributed generation systems and shall summarize its observations in its annual Compliance Report.

## **Attachment A**

### **Qualifications for Residential and Small Non-Residential Solar Water Heating and Space Heating**

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement which is in conflict with a site-specific governmental requirement shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

#### Equipment Specifications

1. Domestic Solar Water Heating systems will be rated by the SRCC and meet the OG-300 system standard. Systems that include OG-100 collectors, but are not certified under OG-300, will need to be verified by submitting either a testing certification for a substantially similar system prepared by a publicly funded laboratory or by submitting an engineering report stamped by a registered third-party professional engineer detailing annual energy savings. Solar Space Heating systems will utilize OG-100 collectors.
2. Solar Space Heating systems will be sized in conformance with the Solar Space Heating Incentive Calculation Procedure (Attachment B.) Compliance reporting production will be based on the design energy savings submitted at time of application.
3. Active, open-loop systems are not eligible for RECPP incentives except for active, open-loop systems that have a proven technology or design that limits scaling and internal corrosion of system piping, and includes appropriate automatic methods for freeze protection and prevents stagnation temperatures that exceed 250 degrees Fahrenheit ("F"). under all conditions at the location of installation. Details disclosing conformance with this exception shall be submitted as part of the manufacturer's verification documentation.
4. The 'high' limit on all Domestic Water Heating controllers shall be set no higher than 160 degrees F.
5. Active thermal storage for solar space heating systems shall use water as the storage element.
6. Contractors must provide a minimum of a five year equipment warranty as provided by the system manufacturer, including a minimum warranty period of five years for repair/replacement service to the customer.
7. Domestic Water Heating systems that are installed as an addition to an existing system or are submitted as a customer designed system or not certified to OG-300 must be specifically reviewed and approved by the utility.
8. The solar collector, heat exchangers, and storage elements shall have an equipment warranty of at least 5 years to qualify for a UFI and at least five years to qualify either for a UFI or for a PBI.

## Installation Guidance

1. The system shall be installed with a horizontal tilt angle between 20 degrees and 60 degrees (40 and 60 degrees for space heating applications), and an azimuth angle of +/- 60 degrees of due south (+/- 20 degrees for space heating applications). It is recommended that collectors be positioned for optimum winter heating conditions at a minimum tilt angle of 45 degrees above horizontal, or as recommended by the manufacturer for the specific collector type and geographic location of installation. Azimuth or tilt angles outside these parameters may be reviewed and approved by the utility, at their discretion.
2. All systems should be installed such that the energy collection system is substantially unshaded and should have substantially unobstructed exposure to direct sunlight between the hours of 9:00 a.m. and 3:00 p.m. Solar Hot Water de-rating chart (see Attachment C and D in this section) may be used to adjust incentive level based upon affected output due to shading.
3. Heat exchange fluid in glycol systems should be tested, flushed and refilled with new fluid as necessary or at a minimum every five years or sooner per manufacturer's recommendations.
4. It is recommended that the anode rod be checked and replaced per manufacturer's recommendations, but no less frequently than every five years.
5. It is recommended that the system design include a timer, switch, and a temperature sensor on the backup element of the storage tank.
6. The collectors and storage tank should be in close proximity to the backup system and house distribution system to avoid excessive pressure or temperature losses.
7. It is recommended that in areas where water quality problems are reported to have reduced the expected life of a solar water heater, that a water quality test is performed for each residence to screen for materials that through interaction with the materials of the proposed solar water heating system may reduce the expected operational life of the system components. The customer should consider contacting the manufacturer to determine if warranty or operational life will be affected.
8. In areas subject to snow accumulation, sufficient clearance will be provided to allow a 12" snowfall to be shed from a solar collector without shadowing any part of the collector.
9. Ball valves shall be used throughout the system. Gate valves shall not be used in any new installation systems.
10. Pipes carrying heated fluids shall be insulated for thermal energy conservation as well as personnel protection when exposed to ambient conditions, although this is highly recommended in either situation.
11. TEP reserves the right to modify standards as technology changes on a case by case basis, pending independent laboratory analysis, Professional Engineer ("PE") stamp, or TEP engineering analysis.

## General Requirements

1. The project must comply with applicable local, state, and federal regulations.
2. Products must be installed according to manufacturers' recommendations.
3. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale on new installations.
5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.
6. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable

energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.

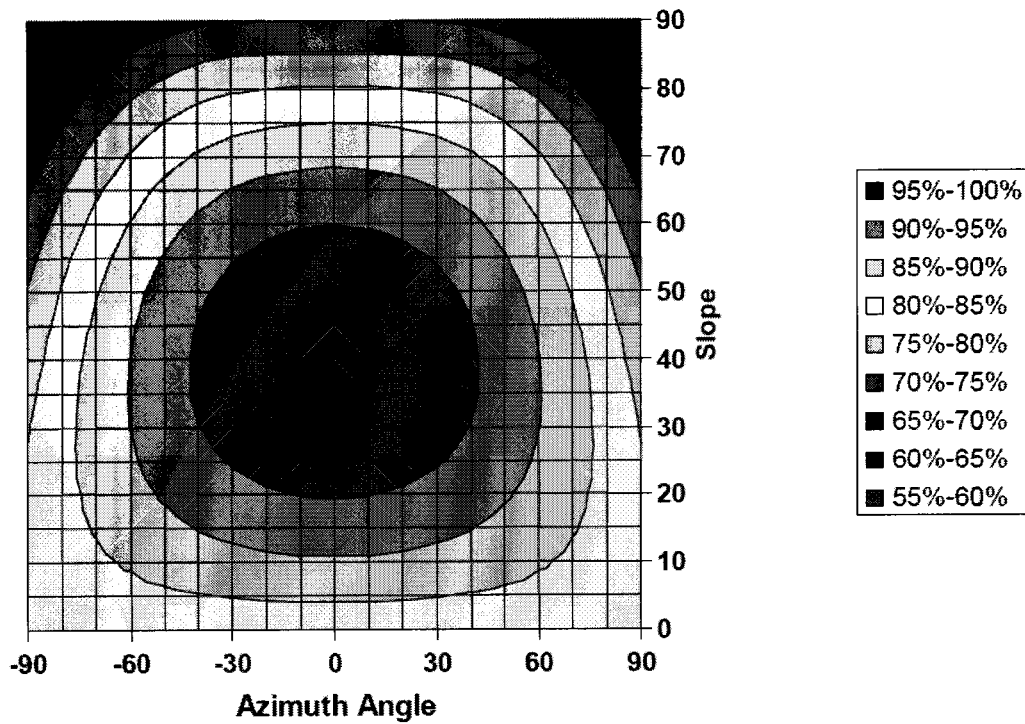
7. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment. For these requirements, see Commission Decision No. 69674 located at <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf>
8. Existing systems that are replacing major components may be submitted and reviewed by the utility for the retrofit category of the program's incentive.

**Attachment B**  
**Solar Space Heating UFI Incentive Calculation Procedure**

TEP requires specific design documents for solar water/space heating installations. TEP will review the design, compare to similarly situated installations, require data logging/monitoring to be used, and may consult industry experts in determining the actual kWh saved by such systems. TEP reserves the right to change review procedures as technologies advance and/or review protocol is improved.

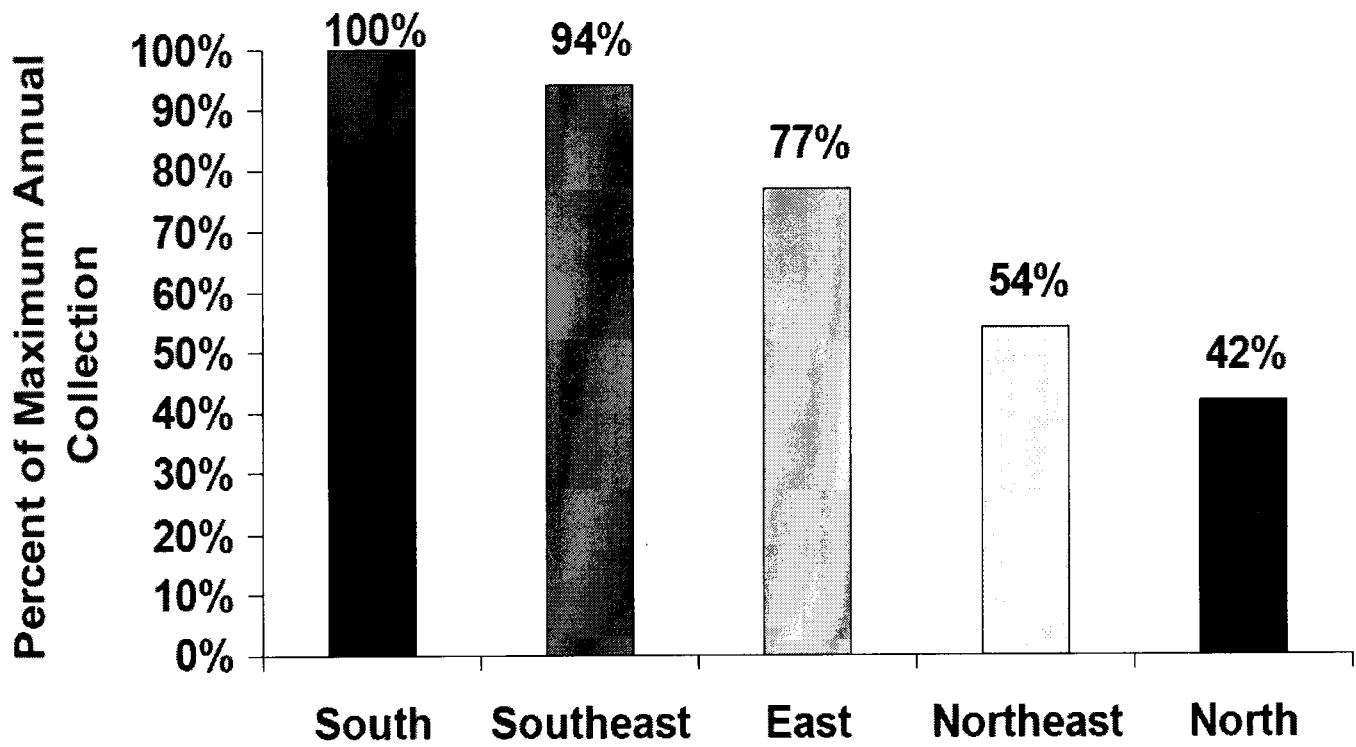
**Attachment C**  
**Solar Hot Water Off-Angle and Shading Annual Energy Derating Chart**

I  
**Orientation Effect on Annual Output**



If the SHW system falls outside of the 95-100% performance band, then the UFI for the system will be derated. The incentive will be derated based on the decrease in annual energy output anticipated by this chart.

**Attachment D**  
**Solar Hot Water System Azimuth Angle Derating Chart**



## **Non-Residential Solar Water Heating and Space Heating: Systems with Annual Production Output Greater Than 400,000 kWh Equivalent**

### **INCENTIVE LEVELS FOR LARGE NON-RESIDENTIAL SOLAR WATER HEATING AND SPACE HEATING SYSTEMS**

Solar water heating and space heating in large non-residential applications are eligible for performance-based incentives (PBIs). In the case of solar water heating and space heating, the PBI allows the customer to collect incentive payments in relation to the actual system production. Table 4 identifies the maximum incentives available for large non-residential solar water heating and space heating systems.

In all cases, incentive values listed in Table 4 are maximum values. PBIs are awarded through a bid process, which is discussed later in this section. Applicants are encouraged to submit bids requesting incentive amounts less than the maximums listed. Bids requesting a lower level of incentive payment than the maximum will have an increased chance of acceptance in the allocation ranking process.

**Table 4. Maximum Incentives for Large Non-Residential Solar Water Heating and Space Heating**

#### **Maximum Incentive Level for REC Agreement of the Specified Duration\*\***

<b>Year</b>	<b>10-year REC Agreement</b>	<b>15-year REC Agreement</b>	<b>20-year REC Agreement</b>
2011	\$0.057/kWh	\$0.052/kWh	\$0.051/kWh

Notes:

\*\*Incentive level is based upon \$/kWh equivalent output

- There is no incentive cap for non-residential systems other than annual program funding considerations.
- A PBI cannot exceed 60% of the real project costs, defined as the undiscounted total system cost plus acceptable financing charges. Acceptable finance charges are finance charges used for the PBI incentive cap calculation and cannot exceed the current prime interest rate plus 5%. Financing charges must be disclosed as part of the commissioning package, if not disclosed before.
- The customer must pay at least 15% of the project cost, after other government incentives (e.g., tax credits) are considered. (See explanation of incentive calculation below.)
- Systems may not be eligible to receive RECPP incentives if other utility incentives are applied.
- TEP will require and perform specific design analysis and review on project design estimates.
- The bid evaluator reserves the right to award incentives to solar thermal projects other than those that meet the specifications outlined in Attachment A. Incentives in these cases will be determined by the bid evaluator.

The incentive amount will be calculated at the time the application is approved for reservation. If federal or state incentives change during the period of time after the reservation approval, the incentive amount reserved will not be changed as long as the reservation is not cancelled.

TEP's payment of a PBI will assure TEP complete and irrevocable ownership of the REC for the full duration of the PBI agreement. The agreement duration must fully coincide with the PBI payment schedule and the system must be supported by system warranty or planned maintenance schedules for the term of the agreement.



## **PROJECT FUNDING**

Non-residential funds will be committed as bids are accepted; funds may be placed in reserve for later in the year. As a result, the budget may be committed before the end of the year. Funds will be made available to projects based on a ranking generated by lowest expected life cycle credit purchase cost as provided in the application and verified by TEP. Projects submitted to the utility for reservation will be ranked based on a calculated index value for purposes of allocating non-residential funds as proposed in the application and verified by TEP. Lowest lifecycle cost projects will be funded first. Indexing of the non-residential projects will be performed based on the verified incentive values and duration of the proposed agreement in the application for that project. In addition, the bid evaluator assesses the likelihood that the project will be completed. Projects with higher incentive payments result in a higher expected life cycle credit purchase cost and projects that produce more kWh result in a lower expected life cycle credit purchase cost. In the event of a tie in the ranking, when the program would be fully subscribed if both projects were given reservation status, funds will be awarded based on the date of receipt of the completed reservation request.

Reservation requests will reviewed by the utility on a monthly basis. Once reservation requests are fully ranked each month, notification of reservation approvals and rejections will be made in conformance with the rankings and available funding.

Funds unused in one period will be equally divided among the remaining periods in that year. Funds allocated to non-residential projects will not roll forward from one year to the next. Reservations which are rejected as a result of insufficient program funds may elect to carry forward into the next period and retain the original reservation date. The election must be made at the time of the original application.

## **THE FINE PRINT**

In addition to the other requirements described in this hand book, there are two other types of program details of which system owners and installers should be aware:

1. Installer qualifications
2. System removal

These are described in further detail below.

### **Installer Qualifications**

All systems receiving incentives under the RECPP must be installed by a qualified installer. The following requirements must be submitted by the applicant as part of the reservation request. TEP will verify that the installer meets the following minimum qualifications prior to confirming a reservation request:

1. The installer must possess a valid license on file with the Arizona Registrar of Contractors ("AZROC") with a license classification appropriate for the technology being installed. Alternatively, the installer must identify use of a contractor holding an appropriate license on file with the AZROC for the technology being installed. A copy of the AZROC license must be provided as part of the reservation request.
2. The installer must possess an Arizona business license that is active and in good standing.

Installers may request that the above information be retained on file with TEP; however, under this option the installer must certify that the information on file remains current with the submission of each reservation request. Information on file must be renewed yearly.

### **System Removal**

If receiving a PBI, the Qualifying System or any components thereof shall not be removed from the premises until the last day of the final month of the final full calendar year of the applicable incentive payment term in the Agreement following completion of system installation of the renewable energy system, without express agreement from TEP. If the Qualifying System is removed in violation of this provision, customer shall immediately reimburse TEP all incentive amounts paid by TEP to customer or on behalf of customer to an authorized third party.

In addition, if a Qualified System is removed, TEP shall monitor that specific customer site to ensure that an additional incentive is not provided for any new distributed renewable energy resource system on that site until the REC contracted operational life of the original system has been completed.

TEP shall attempt to monitor the number of missing or non-working distributed generation systems and shall summarize its observations in its annual Compliance Report.

## **Attachment A**

### **Qualifications for Large Non-Residential Solar Water Heating and Space Heating**

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement which is in conflict with a site-specific governmental requirement shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

#### Equipment Qualifications

1. Solar collector panels used will have a SRCC OG-100 certification or publicly-funded laboratory documentation showing the panel energy output under controlled and replicable test conditions.
2. If annual energy production is expected to exceed 10,000 kWh or equivalent, the system must include a dedicated performance customer-supplied meter to allow for monitoring of the amount of useful heat produced. Otherwise, compliance reporting production will be based on the design energy savings submitted at time of application.
3. Energy savings and designed output for the system will be verified by submitting either a testing certification for a substantially similar system prepared by a publicly funded laboratory or by submitting an engineering report stamped by a registered professional engineer. The engineering report shall provide a description of the system and major components, design criteria and performance expectations, applicable standards and/or codes, and a brief history of components in similar applications.
4. The solar collector, heat exchangers and storage elements shall have an equipment warranty of at least five years to qualify for a PBI.
5. The system will in all cases have a material and full labor warranty of at least five years.

#### Installation Guidance

1. The horizontal tilt angle of the collector panels should be between 20 and 60 degrees (30 and 60 degrees for space heating applications) and an azimuth angle +/- 45 degrees of south. Azimuth or tilt angles outside these parameters may be reviewed and approved by the utility, at their discretion.
2. All systems should be installed such that the energy collection system is substantially unshaded and should have substantially unobstructed exposure to direct sunlight between the hours of 9:00 a.m. and 3:00 p.m. Solar Hot Water de-rating chart (see Attachment C and D in this section) may be used to adjust incentive level based upon affected output due to shading.
3. The system installation should comply with the design manual.
4. Heat exchange fluid in glycol systems should be tested, flushed and refilled with new fluid as necessary or at a minimum every five years or sooner per manufacturer's recommendations.

5. It is recommended that the anode rod be checked and replaced per manufacturer's recommendations, but no less frequently than every five years.
6. It is recommended that the system design include a timer, switch, and a temperature sensor on the backup element of the storage tank.
7. It is recommended that in areas where water quality problems are reported to have reduced the expected life of a solar water heater, that a water quality test is performed for each residence to screen for materials that through interaction with the materials of the proposed solar water heating system may reduce the expected operational life of the system components. The customer should consider contacting the manufacturer to determine if warranty or operational life will be affected.
8. In areas subject to snow accumulation, sufficient clearance will be provided to allow a 12" snowfall to be shed from a solar collector without shadowing any part of the collector.
9. Each system shall have a comprehensive operation and maintenance manual at the customer's site, which includes a spare parts list, data sheets and flow diagrams indicating operating temperatures and pressures, maintenance schedules and description of testing methods and each customer must complete an initial start up and operation training review with the contractor at the time of system start up
10. TEP reserves the right to modify standards as technology changes on a case by case basis, pending independent laboratory analysis, Professional Engineer ("PE") stamp, or TEP engineering analysis

#### General Requirements

1. The project must comply with applicable local, state, and federal regulations.
2. Products must be installed according to manufacturers' recommendations.
3. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.
5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.
6. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.
7. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment.

## **Ground Source Heat Pumps: Residential and Non-Residential Applications**

### **INCENTIVE LEVELS FOR RESIDENTIAL AND NON-RESIDENTIAL GROUND SOURCE HEAT PUMP SYSTEMS**

Residential and small non-residential ground source heat pump systems are eligible for up-front incentives ("UFIs"). UFIs are those incentives where the customer receives a one-time payment based on the system's designed capacity. Table 5 identifies the incentives available for GSHP systems.

**Table 5. Up-Front Incentives for Residential and Non-Residential Ground Source Heat Pump Systems**

Year	Incentive Level
2011	\$500/ton
<p>Notes:</p> <p>*Indicates that the incentive for that year has not yet been approved by the Commission. As such, these incentives are tentative and may change pending Commission approval.</p> <ul style="list-style-type: none"><li>• Customers will receive a UFI up to a cap of 200 tons.</li><li>• The UFI may not exceed 30% of total system cost.</li><li>• The UFI may not exceed 60% of total System Cost.</li><li>• The customer must pay at least 15% of the project cost, after other government incentives (e.g., tax credits) are considered. (See explanation of incentive calculation below.)</li><li>• Systems may not be eligible to receive RECPP incentives if other utility incentives are applied.</li></ul>	

The incentive amount will be calculated at the time the application is approved for reservation. If federal or state incentives change during the period of time after the reservation approval, the incentive amount reserved will not be changed as long as the reservation is not cancelled.

In return for TEP's payment of a UFI, TEP will be given complete and irrevocable ownership of the RECs until December 31<sup>st</sup> of the 20<sup>th</sup> full calendar year after completion of installation of the system. Operational life during that time frame must be supported by system warranty or planned maintenance schedules.

### **PROJECT FUNDING**

Funds will be made available for reservations on a first-come, first-reserved basis, until annual funding is reserved. Reservations which are rejected as a result of insufficient funds will be placed on a waiting list and offered the opportunity to retain their original reservation date for one additional quarter without the need to resubmit application documentation. If the incentive level has changed from the date of the original reservation to the date when the reservation is approved, the new incentive level shall be applied.

### **PROJECT REQUIREMENTS AFTER INSTALLATION**

After completing the installation of a small distributed energy system, the customer must continue to provide information to TEP about the system's performance.

All customers receiving renewable energy self-generation incentives are obligated to report system production to TEP in accordance with the reporting schedule established in the program agreement between TEP and the customer. TEP, at its option, may perform periodic inspection of the system for operation, metered production, and reporting purposes.

## **THE FINE PRINT**

In addition to the other requirements described in this hand book, there are two other types of program details of which system owners and installers should be aware:

1. Installer qualifications
2. System removal

These are described in further detail below.

### **Installer Qualifications**

All systems receiving incentives under the RECPP must be installed by a qualified installer. The following requirements must be submitted by the applicant as part of the reservation request. TEP will verify that the installer meets the following minimum qualifications prior to confirming a reservation request:

1. The installer must possess a valid license on file with the Arizona Registrar of Contractors ("AZROC") with a license classification appropriate for the technology being installed. Alternatively, the installer must identify use of a contractor holding an appropriate license on file with the AZROC for the technology being installed. A copy of the AZROC license must be provided as part of the reservation request.
2. The installer must possess an Arizona business license that is active and in good standing.

Installers may request that the above information be retained on file with TEP; however, under this option the installer must certify that the information on file remains current with the submission of each reservation request. Information on file must be renewed yearly.

### **System Removal**

If receiving a UFI, neither the Qualifying System nor any components thereof shall be removed from the premises (by either the applicant or future owners or occupants of the property) until December 31<sup>st</sup> of the 20<sup>th</sup> full calendar year following completion of system installation of the renewable energy system, without express agreement of TEP. If the Qualifying System is removed by any party in violation of this provision, customer shall immediately reimburse TEP all incentive amounts paid by TEP to customer or on behalf of customer to an authorized third party.

In addition, if a Qualified System is removed, TEP shall monitor that specific customer site to ensure that an additional incentive is not provided for any new distributed renewable energy resource system on that site until the REC contracted operational life of the original system has been completed.

TEP shall attempt to monitor the number of missing or non-working distributed generation systems and shall summarize its observations in its annual Compliance Report.

## ATTACHMENT A

### QUALIFICATIONS FOR RESIDENTIAL AND NON-RESIDENTIAL GROUND SOURCE HEAT PUMP SYSTEMS

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement which is in conflict with a site-specific governmental requirement shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

#### Equipment Qualifications

1. Geothermal system installations involving a regulated boiler or pressure vessel are required to comply with all Arizona state boiler regulations; provide a qualifying boiler inspection identification number; and keep all applicable permits in good standing.
2. Energy savings and designed output for the system will be verified by submitting either a testing certification for a substantially similar system prepared by a publicly-funded laboratory or by submitting an engineering report stamped by a registered third-party professional engineer. The engineering report shall provide a description of the system and major components, design criteria and performance expectations, applicable standards and/or codes, and a brief history of components in similar applications.
3. Energy production for space heating, space cooling and process heating will be calculated as one kWh of energy per 3,415 BTU of useful heat delivered by the system as measured by a dedicated heat delivery measuring meter and used by the building space or process.
4. The system will have a material and labor warranty of at least five years.
5. The system must meet Arizona DEQ environmental standards.
6. The most current Energy Star Standards must be achieved. These can be found at <http://www.energystar.gov/index.cfm?c=geoheat.prccritgeoheatpumps>.

#### Installation Guidance

Because of the individual nature of geothermal systems, care should be taken to make sure the system complies with all applicable permitting and regulatory requirements including, but not limited to, air emission standards and air permit regulations.

#### General Requirements

1. The project must comply with applicable local, state, and federal regulations.
2. Products must be installed according to manufacturers' recommendations.
3. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.



4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.
5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.
6. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.
7. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment.

## Wind Systems Smaller Than 1 MW

Tucson Electric Power Company ("TEP" or the "Company") is committed to assisting our customers in developing their own renewable generation resources, through a balanced and supportive renewable energy distributed generation incentive program. Our goal is to create a program that will provide incentives for affordable, environmentally sensitive, customer-sited renewable energy generation systems to supplement TEP customer's energy needs. A properly designed system, matched to a customer's energy use, will provide a reduction in utility bills through the use of renewable resources. This program reflects our commitment to reduce the cost of developing renewable energy resources.

### INCENTIVE LEVELS FOR SMALL WIND SYSTEMS

Wind systems smaller than 1 MW are eligible for up-front incentives ("UFIs"). UFIs are those incentives where the customer receives a one-time payment based on the system's designed capacity. Table 6 identifies the incentives available for wind systems smaller than 1 MW.

**Table 6. Up-Front Incentives for Small Wind Systems**

YEAR	ON-GRID INCENTIVE LEVEL	OFF-GRID INCENTIVE LEVEL
2011	\$2.25/W AC	\$1.80/W AC
<p>Notes:</p> <p>*Indicates that the incentive for that year has not yet been approved by the Commission. As such, these incentives are tentative and may change pending Commission approval.</p> <ul style="list-style-type: none"><li>• TEP customers will receive a UFI up to a cap of 1 MW. If a system is installed larger than 1 MW, it must apply under the utility-scale program.</li><li>• The UFI may not exceed 60% of total System Cost.</li><li>• The customer must pay at least 15% of the project cost, after other government incentives (e.g., tax credits) are considered. (See explanation of incentive calculation below.)</li><li>• Systems may not be eligible to receive RECPP incentives if other utility incentives are applied.</li></ul>		

The incentive amount will be calculated at the time the application is approved for reservation. If federal or state incentives change during the period of time after the reservation approval, the incentive amount reserved will not be changed as long as the reservation is not cancelled.

In return for TEP's payment of a UFI, TEP will be given complete and irrevocable ownership of the RECs until December 31<sup>st</sup> of the 20<sup>th</sup> full calendar year after completion of installation of the system. Operational life during that time frame must be supported by system warranty or planned maintenance schedules.

### PROJECT FUNDING

Funds will be made available for reservations on a first-come, first-reserved basis, until annual funding is reserved. Reservations which are rejected as a result of insufficient funds will be placed on a waiting list and offered the opportunity to retain their original reservation date for one additional quarter without the need to resubmit application documentation. If the incentive level has changed from the date of the original reservation to the date when the reservation is approved, the new incentive level shall be applied.

## **NET METERING**

All projects must comply with Commission net metering rules.

## **PROJECT REQUIREMENTS AFTER INSTALLATION**

After completing the installation of a small wind project, the customer must continue to provide information to TEP about the system's performance.

All customer systems receiving renewable energy self-generation incentives are obligated to include a TEP-supplied production meter, which will report system production to TEP in accordance with the regular meter-reading schedule. TEP, at its option, may perform periodic inspection of the system for operation, metered production, and reporting purposes.

## **THE FINE PRINT**

In addition to the other requirements described in this hand book, there are two other types of program details of which system owners and installers should be aware:

1. Installer qualifications
2. System removal

These are described in further detail below.

### **Installer Qualifications**

All systems receiving incentives under the RECPP must be installed by a qualified installer. The following requirements must be submitted by the applicant as part of the reservation request. TEP will verify that the installer meets the following minimum qualifications prior to confirming a reservation request:

1. The installer must possess a valid license on file with the Arizona Registrar of Contractors ("AZROC") with a license classification appropriate for the technology being installed. Alternatively, the installer must identify use of a contractor holding an appropriate license on file with the AZROC for the technology being installed. A copy of the AZROC license must be provided as part of the reservation request.
2. The installer must possess an Arizona business license that is active and in good standing.

Installers may request that the above information be retained on file with TEP; however, under this option the installer must certify that the information on file remains current with the submission of each reservation request. Information on file must be renewed yearly.

### **System Removal**

If receiving a UFI, neither the Qualifying System nor any components thereof shall be removed from the premises (by either the applicant or future owners or occupants of the property) until December 31<sup>st</sup> of the 20<sup>th</sup>

full calendar year following completion of system installation of the renewable energy system, without express agreement of TEP. If the Qualifying System is removed by any party in violation of this provision, customer shall immediately reimburse TEP all incentive amounts paid by TEP to customer or on behalf of customer to an authorized third party.

In addition, if a Qualified System is removed, TEP shall monitor that specific customer site to ensure that an additional incentive is not provided for any new distributed renewable energy resource system on that site until the REC contracted operational life of the original system has been completed.

TEP shall attempt to monitor the number of missing or non-working distributed generation systems and shall summarize its observations in its annual Compliance Report.

## **Attachment A**

### **Qualifications for Wind Systems Smaller Than 1 MW**

A small wind generator is a system with a nameplate capacity rating of One MW or less. The technology criteria described below are intended for small wind generators with a nameplate rating of 50 kW or less. Larger systems will be required to submit a detailed package describing site selection, energy production modeling, and an engineered system design and installation report.

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement which is in conflict with a site-specific governmental requirement shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

#### **Equipment Qualifications**

1. Eligible small wind systems must be certified and nameplate rated by the Consumer Energy Center ("CEC")<sup>6</sup>. See [www.consumerenergycenter.org/erprebate/equipment.html](http://www.consumerenergycenter.org/erprebate/equipment.html) for a list of certified generators. For grid tied or off-grid wind generators where an inverter is used, the CEC listed nameplate rating of the wind generator will be multiplied by the CEC approved weighted efficiency percentage listed for the inverter in the "List of Eligible Inverters" at [www.consumerenergycenter.org/cgi-bin/eligible\\_inverters.cgi](http://www.consumerenergycenter.org/cgi-bin/eligible_inverters.cgi) to calculate the wind turbine nameplate rating for use in determining the UFI payment.<sup>7</sup>
2. Grid connected inverters used as part of the system shall carry a UL listing certifying full compliance with Underwriter's Laboratory ("UL")-1741.
3. A system must include a dedicated performance meter (provided by TEP) installed to allow for measurement of the amount of electricity produced.
4. The performance meter and utility disconnect for grid tied systems will be installed in a location readily accessible by TEP during normal business hours.
5. Off-grid systems of capacity less than 10 kW AC will not be metered. Compliance reporting production will be based on an annual 20% capacity factor.
6. The tower used in the installation must be designed by an Arizona registered engineer and must be suitable for use with the wind generator. Tower installation must be designed and supervised by individuals familiar with local geotechnical conditions.

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<sup>6</sup> TEP recommends review of the SWCC standards for rating small wind generators once they become available for purposes of supplanting the CEC requirement in this Technology Criterion.

<sup>7</sup> Inverter outputs are rated in dc Watts and must be converted to ac Watts for incentive calculation purposes.

7. To receive a UFI, the wind generator and system must be covered by a manufacturer's warranty of at least 5 years. Otherwise the system will qualify for a PBI. In all cases, the wind system will have a material and labor warranty of at least five years.

#### Installation Guidance

1. Location: a wind turbine hub should be at least 20 feet above any surrounding object and at least 28 feet above the ground within a 250-foot radius. Wind generators should be installed in locations with an elevation at or above the general elevation of the surrounding terrain.
2. Lot Size: should be one-half acre at minimum. Municipalities and public facilities such as schools and libraries are exempt from the minimum lot size requirements.

#### General Requirements

1. The project must comply with applicable local, state, and federal regulations.
2. Products must be installed according to manufacturers' recommendations.
3. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.
5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.
6. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.
7. Wind system components shall be properly labeled, including AC & DC disconnects (if present), wind generation meter, service panel (outside cover), and breakers inside the service panel.
8. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment.

See <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf> for these requirements.

## Non-Residential Solar Daylighting

### INCENTIVE LEVELS FOR NON-RESIDENTIAL SOLAR DAYLIGHTING SYSTEMS

Non-residential solar daylighting systems are eligible for up-front incentives (“UFIs”). The UFI allows the customer to collect incentive payments in direct relation to the actual system production. Table 7 identifies the incentives available for non-residential daylighting systems.

**Table 7. Up-Front Incentives for Non-Residential Daylighting Systems**

Year	Incentive Level
2011	\$0.18/kWh savings during first five years
Notes:	
<ul style="list-style-type: none"><li>• The per-kWh incentive applies only to estimated energy savings during the first five years of project operation.</li><li>• The UFI may not exceed 60% of total System Cost.</li><li>• The customer must pay at least 15% of the project cost, after other government incentives (e.g., tax credits) are considered. (See explanation of incentive calculation below.)</li><li>• Systems may not be eligible to receive RECPP incentives if other utility incentives are applied.</li><li>• As described later in this document, these incentive levels may be decreased because of sub-optimal system positioning.</li></ul>	

The incentive amount will be calculated at the time the application is approved for reservation. If federal or state incentives change during the period of time after the reservation approval, the incentive amount reserved will not be changed as long as the reservation is not cancelled.

In return for TEP’s payment of a UFI, TEP will be given complete and irrevocable ownership of the RECs until December 31<sup>st</sup> of the 20<sup>th</sup> full calendar year after completion of installation of the system. Operational life during that time frame must be supported by system warranty or planned maintenance schedules.

### PROJECT FUNDING

Funds will be made available for reservations on a first-come, first-reserved basis, until annual funding is reserved. Reservations which are rejected as a result of insufficient funds will be placed on a waiting list and offered the opportunity to retain their original reservation date for one additional quarter without the need to resubmit application documentation. If the incentive level has changed from the date of the original reservation to the date when the reservation is approved, the new incentive level shall be applied.

Funds unused in one period will be equally divided among the remaining periods in that year. Funds allocated to non-residential projects will not roll forward from one year to the next. Reservations which are rejected as a result of insufficient program funds may elect to carry forward into the next period and retain the original reservation date. The election must be made at the time of the original application.

## **THE FINE PRINT**

In addition to the other requirements described in this hand book, there are two other types of program details of which system owners and installers should be aware:

1. Installer qualifications
2. System removal

These are described in further detail below.

### **Installer Qualifications**

All systems receiving incentives under the RECPP must be installed by a qualified installer. The following requirements must be submitted by the applicant as part of the reservation request. TEP will verify that the installer meets the following minimum qualifications prior to confirming a reservation request:

1. The installer must possess a valid license on file with the Arizona Registrar of Contractors ("AZROC") with a license classification appropriate for the technology being installed. Alternatively, the installer must identify use of a contractor holding an appropriate license on file with the AZROC for the technology being installed. A copy of the AZROC license must be provided as part of the reservation request.
2. The installer must possess an Arizona business license that is active and in good standing.

Installers may request that the above information be retained on file with TEP; however, under this option the installer must certify that the information on file remains current with the submission of each reservation request. Information on file must be renewed yearly.

### **System Removal**

If receiving a PBI, the Qualifying System or any components thereof shall not be removed from the premises until the last day of the final month of the final full calendar year of the applicable incentive payment term in the Agreement following completion of system installation of the renewable energy system, without express agreement from TEP. If the Qualifying System is removed in violation of this provision, customer shall immediately reimburse TEP all incentive amounts paid by TEP to customer or on behalf of customer to an authorized third party.

In addition, if a Qualified System is removed, TEP shall monitor that specific customer site to ensure that an additional incentive is not provided for any new distributed renewable energy resource system on that site until the REC contracted operational life of the original system has been completed.

TEP shall attempt to monitor the number of missing or non-working distributed generation systems and shall summarize its observations in its annual Compliance Report.



## **Attachment A**

### **Qualifications for Non-Residential Solar Daylighting**

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement, which is in conflict with a site-specific governmental requirement, shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

#### Equipment Qualifications

All systems shall include the following components as part of the day lighting system:

1. Skylights must adhere to the 2009 International Energy Conservation Code with regard to the U-factor and solar heat gain coefficient and must have a minimum visible transmittance based on the CPUC Savings by Design program (Note: U-value and SHGC ratings should be based on a 20 degree ratings, now standard through the NFRC):
  - Maximum U-factor of 0.75
  - Maximum solar heat gain coefficient of 0.35
  - Minimum visible transmittance of 0.45
2. Skylight can be in a toplighting configuration only.
3. Skylight area may not exceed 3% of the gross roof area.
4. Skylights must be certified by the National Fenestration Rating Council (NFRC).
5. If artificial lighting systems remain a part of the installation, the system shall include automated lighting control(s) which are programmed to keep electric lights off/dimmed during daylight hours of sufficient solar insulation to provide minimum design illumination levels.
6. The system will have a material and labor warranty of at least five years.

#### Installation Guidance

All systems should be installed such that the skylight dome is substantially unshaded and have substantially unobstructed exposure to direct sunlight between the hours of 9:00 a.m. and 3:00 p.m.

#### General Qualifications

1. The project must comply with applicable local, state, and federal regulations.
2. Products must be installed according to manufacturers' recommendations.
3. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.

5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.
6. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.
7. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment. See <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf> for these requirements.

## Additional Technologies with Prescriptive Incentives

- (1) Biomass/Biogas or Geothermal Space Heating, Process Heating, or Space Cooling: Non-Residential  
 (2) Biomass/Biogas, Hydro or Geothermal Electric  
 (3) Solar Space Cooling

### INCENTIVE LEVELS FOR ADDITIONAL TECHNOLOGIES

The additional distributed energy technologies in residential and small non-residential applications are eligible for performance-based incentives ("PBIs"). The PBI allows the customer to collect incentive payments in direct relation to the actual system production. These incentive levels are specific to each of the groups of technologies. Table 8 summarizes the incentive levels for these technologies for REC agreements signed in 2011;

In all cases, incentive values listed in Table 8. PBIs are awarded through a bid process, which is discussed later in this section. Applicants are encouraged to submit bids requesting incentive amounts less than the maximums listed. Bids requesting a lower level of incentive payment than the maximum will have an increased chance of acceptance in the allocation ranking process.

**Table 8. Maximum Incentives for Additional Technologies for 2011**

TECHNOLOGY/APPLICATION	10-YEAR REC AGREEMENT SIGNED IN 2011 (\$/KWH)	15-YEAR REC AGREEMENT SIGNED IN 2011 (\$/KWH)	20-YEAR REC AGREEMENT SIGNED IN 2011 (\$/KWH)
Biomass/Biogas (Electric)	\$0.060	\$0.056	\$0.054
Biomass/Biogas – CHP (Electric) <sup>3</sup>	\$0.035	\$0.032	\$0.031
Biomass/Biogas – CHP (Thermal) <sup>3</sup>	\$0.018	\$0.017	\$0.016
Biomass/Biogas (thermal)	\$0.015	\$0.014	\$0.013
Biomass/Biogas (cooling)	\$0.032	\$0.030	\$0.029
Geothermal – (electric)	\$0.024	\$0.022	\$0.022
Geothermal – (thermal)	\$0.048	\$0.045	\$0.043
Small Hydro	\$0.060	\$0.056	\$0.054
Solar Space Cooling	\$0.129	\$0.120	\$0.115

Notes:

\*1<sup>st</sup> year savings.

- There is no incentive cap for non-residential systems other than annual program funding considerations.
- A PBI cannot exceed 60% of the real project costs, defined as the undiscounted total system cost plus acceptable financing charges. Acceptable finance charges are finance charges used for the PBI incentive cap calculation and cannot exceed the current prime interest rate plus 5%. Financing charges must be disclosed as part of the commissioning package, if not disclosed before.
- The customer must pay at least 15% of the project cost, after other government incentives (e.g., tax credits) are considered. (See explanation of incentive calculation below.)
- The CHP incentives may be used in combination for the appropriate components of one system.
- The solar space heating and cooling incentives may be used in combination for the appropriate components of the system.

- Systems may not be eligible to receive RECPP incentives if other utility incentives are applied.

System Cost for a solar space heating system will not include the cost of any passive thermal storage or the cost of the building heating system itself. It will include the cost of new materials and installation of active thermal storage, expansion tanks, controls, tempering valves, piping, vents, drains, safety valves and all freeze protection.

The incentive amount will be calculated at the time the application is approved for reservation. If federal or state incentives change during the period of time after the reservation approval, the incentive amount reserved will not be changed as long as the reservation is not cancelled.

TEP's payment of a PBI will assure TEP complete and irrevocable ownership of the REC for the full duration of the PBI agreement. The agreement duration must fully coincide with the PBI payment schedule and the system must be supported by system warranty or planned maintenance schedules for the term of the agreement.

## **PROJECT FUNDING**

Non-residential funds will be committed as bids are accepted; funds may be placed in reserve for later in the year. As a result, the budget may be committed before the end of the year. Funds will be made available to projects based on a ranking generated by lowest expected life cycle credit purchase cost as provided in the application and verified by TEP, as well as likelihood of construction. Projects submitted to the utility for reservation will be ranked based on a calculated index value for purposes of allocating non-residential funds as proposed in the application and verified by TEP. Lowest lifecycle cost projects will be funded first. Indexing of the non-residential projects will be performed based on the verified incentive values and duration of the proposed agreement in the application for that project. In addition, the bid evaluator assesses the likelihood that the project will be completed. Projects with higher incentive payments result in a higher expected life cycle credit purchase cost and projects that produce more kWh result in a lower expected life cycle credit purchase cost. In the event of a tie in the ranking, when the program would be fully subscribed if both projects were given reservation status, funds will be awarded based on the date of receipt of the completed reservation request.

Reservation requests will reviewed by the utility on a monthly basis. Once reservation requests are fully ranked each month, notification of reservation approvals and rejections will be made in conformance with the rankings and available funding.

Funds unused in one period will be equally divided among the remaining periods in that year. Funds allocated to non-residential projects will not roll forward from one year to the next. Reservations which are rejected as a result of insufficient program funds may elect to carry forward into the next period and retain the original reservation date. The election must be made at the time of the original application.

## **THE FINE PRINT**

In addition to the other requirements described in this hand book, there are two other types of program details of which system owners and installers should be aware:

1. Installer qualifications

## 2. System removal

These are described in further detail below.

### **Installer Qualifications**

All systems receiving incentives under the RECPP must be installed by a qualified installer. The following requirements must be submitted by the applicant as part of the reservation request. TEP will verify that the installer meets the following minimum qualifications prior to confirming a reservation request:

3. The installer must possess a valid license on file with the Arizona Registrar of Contractors ("AZROC") with a license classification appropriate for the technology being installed. Alternatively, the installer must identify use of a contractor holding an appropriate license on file with the AZROC for the technology being installed. A copy of the AZROC license must be provided as part of the reservation request.
4. The installer must possess an Arizona business license that is active and in good standing.

Installers may request that the above information be retained on file with TEP; however, under this option the installer must certify that the information on file remains current with the submission of each reservation request. Information on file must be renewed yearly.

### **System Removal**

If receiving a PBI, the Qualifying System or any components thereof shall not be removed from the premises until the last day of the final month of the final full calendar year of the applicable incentive payment term in the Agreement following completion of system installation of the renewable energy system, without express agreement from TEP. If the Qualifying System is removed in violation of this provision, customer shall immediately reimburse TEP all incentive amounts paid by TEP to customer or on behalf of customer to an authorized third party.

In addition, if a Qualified System is removed, TEP shall monitor that specific customer site to ensure that an additional incentive is not provided for any new distributed renewable energy resource system on that site until the REC contracted operational life of the original system has been completed.

TEP shall attempt to monitor the number of missing or non-working distributed generation systems and shall summarize its observations in its annual Compliance Report.

**Attachment A**  
**Qualifications for Biomass/Biogas or Geothermal Space Heating,  
Process Heating or Space Cooling: Non-Residential Applications**

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement, which is in conflict with a site-specific governmental requirement, shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

**Equipment Qualifications**

1. Biomass/Biogas or geothermal system installations involving a regulated boiler or pressure vessel are required to comply with all Arizona state boiler regulations; provide a qualifying boiler inspection identification number; and keep all applicable permits in good standing.
2. Energy savings and designed output for the system will be verified by submitting either a testing certification for a substantially similar system prepared by a publicly funded laboratory or by submitting an engineering report stamped by a registered professional engineer. The engineering report shall provide a description of the system and major components, design criteria and performance expectations, applicable standards and/or codes, and a brief history of components in similar applications.
3. Energy production for space heating, space cooling and process heating will be calculated as one kWh of energy per 3,415 BTU of useful heat delivered by the system as measured by a dedicated heat delivery measuring meter and used by the building space or process.
4. The system will have a material and labor warranty of at least five years.
5. The system must meet Arizona DEQ environmental standards.

**Installation Guidance**

Because of the individual nature of biomass/biogas or geothermal systems, care should be taken to make sure the system complies with all applicable permitting and regulatory requirements including, but not limited to, air emission standards and air permit regulations.

**General Qualifications**

1. The project must comply with applicable local, state, and federal regulations.
2. Products must be installed according to manufacturers' recommendations.
3. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.

5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.
6. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.
7. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment.  
See <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf> for these requirements.

## **Attachment B**

### **Qualifications for Biomass/Biogas, Hydro, or Geothermal Electric**

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement, which is in conflict with a site-specific governmental requirement, shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

#### Equipment Qualifications

1. Biomass/Biogas, Hydro or Geothermal system installations involving a regulated boiler or pressure vessel are required to comply with all Arizona state boiler regulations; provide a qualifying boiler inspection identification number; and keep all applicable permits in good standing.
2. System must include a dedicated performance meter to allow for monitoring of the amount of electricity produced.
3. Pre-operational/or pre-commissioning energy savings and design output for the system will be verified by submitting either a testing certification for a substantially similar system prepared by a publicly funded laboratory or by submitting an engineering report stamped by a qualified registered professional engineer. The engineering report shall provide a description of the system and major components, design criteria and performance expectations, applicable standards and/or codes, and a brief history of components in similar applications.
4. The system will have a material and labor warranty of at least five years.
5. The system must meet Arizona DEQ environmental standards.

#### Installation Guidance

Because of the individual nature of biomass/biogas hydro or geothermal systems, care should be taken to make sure the system complies with all applicable permitting and regulatory requirements including, but not limited to, air emission standards and air permit regulations.

#### General Qualifications

1. The project must comply with applicable local, state, and federal regulations.
2. Products must be installed according to manufacturers' recommendations.
3. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.
5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.



6. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.
7. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment.  
See <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf> for these requirements.

## **Attachment C**

### **Qualifications for Solar Space Cooling**

The following equipment qualifications listed are mandatory requirements which must be met at the time of project commissioning to receive a RECPP incentive. The installation guidance is intended to provide consumers with information on installation and operation practices which are most likely to support achieving the system's designed output. Installation guidance is mandated in order for a project to receive a RECPP incentive, as it does reflect both industry and TEP concurrence on those practices which are important for a technology to best achieve the designed output. In the future, additional installation guidance items may be considered for inclusion as part of the equipment qualifications.

TEP acknowledges that many regulations and site-specific requirements may apply to the installation of renewable energy technologies. TEP agrees that no requirement imposed by these technology criteria shall be imposed in conflict with any other governmental requirements. Any RECPP-based requirement, which is in conflict with a site-specific governmental requirement, shall be detailed in the reservation request. All qualifying systems must adhere to the following requirements in addition to the RECPP program requirements:

#### Equipment Qualifications

1. The minimum cooling capacity of the system will be 120,000 BTU (10 tons) per hour.
2. Solar collector panels used will have a Solar Rating and Certification Corporation ("SRCC") OG-100 rating or laboratory documentation showing the panel energy output under controlled and replicable test conditions.
3. Energy savings and designed output for the system will be verified by submitting either a testing certification for a substantially similar system prepared by a publicly funded laboratory or by submitting an engineering report stamped by a registered professional engineer. The engineering report shall provide a description of the system and major components, design criteria and performance expectations, applicable standards and/or codes, and a brief history of components in similar applications.
4. System must include a dedicated performance meter to allow for monitoring of the amount of heat input to the thermal cooling device or system. Energy production will be calculated at one kW-hr per 3,415 BTU of metered heat delivered to the thermal cooling device or system.
5. The system will have a material and labor warranty of at least five years.
6. TEP reserves the right to modify standards as technology changes on a case by case basis, pending independent laboratory analysis, Professional Engineer ("PE") stamp, or TEP engineering analysis

#### Installation Guidance

1. The horizontal tilt angle of the collector panels should be between 20 and 60 degrees and an azimuth angle should be between +/- 45 degrees of south.
2. All systems should be installed such that the energy collection system is substantially unshaded and should have substantially unobstructed exposure to direct sunlight between the hours of 9:00 a.m. and 3:00 p.m.
3. The system installation should comply with the design manual.

#### General Qualifications

1. The project must comply with applicable local, state, and federal regulations.

2. Products must be installed according to manufacturers' recommendations.
3. Installations must meet applicable governmental statutes, codes, ordinances, and accepted engineering and installation practices.
4. Systems must be permitted and inspected by the jurisdiction having authority over construction projects in the customer's locale.
5. All major system components must be new and must not have been previously placed in service in any other location or for any other application.
6. All renewable electricity generation systems must include a dedicated performance meter (provided by TEP) which allows for measurement of system energy production. Certain other non-electric renewable energy production systems, noted below, will require customer supplied metering for PBI payment calculation purposes.
7. If the qualifying system is grid-tied, the system must meet Arizona Corporation Commission Interconnection Requirements for Self-Generation Equipment.  
See <http://images.edocket.azcc.gov/docketpdf/0000074361.pdf> for these requirements.

## **Technologies without Technology Specific Criteria**

Technology specific criteria have not yet been developed for the following qualifying technologies:

- Fuel Cells
- Other

For applicants requesting incentives for these technologies or for applicants requesting installation of a technology with specific project technology criteria, but where some criteria cannot be met, the applicant will need to submit design and output documentation.

Applicants installing these systems will, at a minimum, need to provide an energy savings and designed output report for the system. The report must include either a testing certification for a substantially similar system prepared by a publicly funded laboratory or an engineering report stamped by a qualified registered professional engineer. The engineering report and/or testing certification shall provide a description of the system and major components, design criteria and performance expectations, applicable standards and/or codes, and a brief history of components in similar applications. Additional information may be required as part of the RECPP requirements.

## **Non-Conforming Projects**

Non-conforming projects will be identified as the Program evolves. Incentive levels for such projects will be calculated based on TEP engineering analysis, independent laboratory analysis, and/or professional engineering ("PE") stamps. Non-conforming projects that prove combined economic and renewable energy value will be allowed appropriately calculated incentives within the RECPP.

## Appendix 1: Incentive Summary Tables

### RECPP – CONFORMING PROJECT INCENTIVE MATRIX

2011 Program Year

Technology/Application	UP FRONT INCENTIVE <sup>1</sup> 20-Year REC Agreement	10-Year REC Agreement <sup>2</sup> 10-Year Payment (\$/kWh)	15-Year REC Agreement <sup>2</sup> 15-Year Payment (\$/kWh)	20-Year REC Agreement <sup>2</sup> 20-Year Payment (\$/kWh)
BIOMASS/BIOGAS (Electric)	NA	0.060	0.056	0.054
BIOMASS/BIOGAS – CHP (Electric) <sup>3</sup>	NA	0.035	0.032	0.031
BIOMASS/BIOGAS – CHP (Thermal) <sup>3</sup>		0.018	0.017	0.016
BIOMASS/BIOGAS (thermal)	NA	0.015	0.014	0.013
BIOMASS/BIOGAS (cooling)	NA	0.032	0.030	0.029
DAYLIGHTING (Non-Residential)	\$0.18/kWh <sup>7</sup> See this note for clarification	NA	NA	NA
GEOTHERMAL – (electric)	NA	0.024	0.022	0.022
GEOTHERMAL – (thermal)	NA	0.048	0.045	0.043
GROUND SOURCE HEAT PUMP – (cooling)	\$500/ton	NA	NA	NA
SMALL HYDRO	NA	0.060	0.056	0.054
SMALL WIND (grid-tied) <sup>4</sup>	\$2.25/Watt AC	NA	NA	NA
SMALL WIND (off-grid) <sup>4</sup>	\$1.80/Watt AC	NA	NA	NA
SOLAR ELECTRIC:				
RESIDENTIAL (GRID-TIED)	\$2.00/Watt DC <sup>8</sup>	NA	NA	NA
NON-RESIDENTIAL (GRID-TIED) 50 kW AC or less	\$1.50/Watt DC <sup>8</sup>	NA	NA	NA
NON-RESIDENTIAL (GRID-TIED) 51 - 500 kW AC <sup>11</sup>	NA	0.142	0.142	0.142
NON-RESIDENTIAL (GRID-TIED) 500 - 1000 kW AC <sup>11</sup>	NA	0.122	0.122	0.122
NON-RESIDENTIAL (GRID-TIED) More than 1MW AC <sup>11</sup>	NA	0.102	0.102	0.102
RESIDENTIAL (OFF-GRID)	\$2.00/Watt DC <sup>8</sup>	NA	NA	NA
NON-RESIDENTIAL (OFF-GRID)	\$2.00/Watt DC <sup>8</sup>	NA	NA	NA
SOLAR SPACE COOLING <sup>5</sup>	NA	0.116	0.108	0.104
NON-RESIDENTIAL SOLAR WATER HEATING/SPACE HEATING <sup>5,9,10</sup> (35,000 annual kWh output production equivalent or less)	\$750 plus \$0.50/kWh	NA	NA	NA
NON-RESIDENTIAL SOLAR WATER HEATING/SPACE HEATING <sup>5,9,10</sup> (400,000 annual kWh output production equivalent or less)				
RESIDENTIAL SOLAR WATER/SPACE HEATING <sup>6,9,10</sup>	\$750 plus \$0.25/kWh	NA	NA	NA
NON-RESIDENTIAL POOL HEATING <sup>10</sup>	\$750 plus \$0.50/kWh	NA	NA	NA

Notes:

- 1) Residential projects are eligible for an up front incentive (UFI). UFI payments can not exceed 60% of the cost of renewable energy equipment. An additional \$0.20 Watt may be available for residential systems that have first had an approved home energy audit.
- 2) Non-residential systems 50 kW AC or less are UFI only. Non-residential greater than 50 kW AC are PBI only. The total of payments under a production based incentive can not exceed 60% of the project costs for any project.
- 3) The CHP incentives may be used in combination for the appropriate components of one system.
- 4) This UFI applies to a maximum system size of 1 MW.
- 5) The solar space heating and cooling incentives may be used in combination for the appropriate components of one system.
- 6) This category includes both traditional water heating and those systems combined with residential solar water heating used for space heating. Space heating applications require a report detailing energy saving for the complete system.
- 7) Rate applies to measured first five years of energy savings only. Payment is made up-front at beginning of 1<sup>st</sup> year.
- 8) Some UFI based installations will require an adjustment of the incentive as detailed in the PV Incentive Adjustment Chart.
- 9) Energy savings rating is based on the SRCC OG-300 published rating or the TEP-RECPP Space Heating Calculator. The customer contribution must be a minimum of 15% of the project cost after accounting for and applying all available Federal and State incentives.
- 10) Rate applies to forecast/estimated first year energy savings only.
- 11) REC terms may be negotiated in excess of printed maximums to accommodate for higher initial payments.

## Appendix 2: Glossary of Terms

**AZROC** – Arizona Registrar of Contractors.

**Applicant** – Utility customer of record for the Utility Revenue Meter located at the installation site; a builder of the structure (residential or non-residential) who will reserve and install the Qualifying system; or for an off-grid Qualifying System, the property owner for the installation site located within a Utility's service territory.

**Arizona Business License** – A business license issued by the ACC.

**Cancelled** – Reservation Status indicating that a Reservation has been terminated, funding is no longer allocated, and the utility has removed the reservation from the funding queue.

**Cancellation** – The termination of the Reservation.

**Commission** - Arizona Corporation Commission.

**Commissioned** – Qualifying System certified to be in operation.

**Commissioning Package** – Written verification signed by the installer and the customer confirming that the system has been installed in conformance with the approved reservation and that the system is ready for operation.

**Conforming Project** – Any project utilizing a renewable technology listed in Attachment D.

**Conformance Inspection** – Inspection performed by the utility to verify that the system has been installed and operates in conformance with the Reservation application.

**Customer** – Utility customer of record for the Utility Revenue Meter located at the installation site or a builder of the structure (residential or non-residential) who will reserve and install the Qualifying System.

**Extension** – The extension of the Reservation Timeframe.

**Installer** – The entity or individual responsible for the installation of a qualifying system.

**Interconnection Inspection** – Inspection performed by the utility to confirm that the system can be safely interconnected to the power grid.

**Non-Conforming Project** – Non-conforming projects include, but are not limited to, projects with staged completion dates, multi-customer or multi-system projects, projects involving more than one technology, projects requiring new or unique agreement terms, projects with technologies for which qualification standards have not been developed or projects requiring non-standard timeframes.

**Performance Based Incentive ("PBI")** – Incentive based on a rate per actual kWh output or on equivalent kWh of energy savings.

**Project Costs** – System Costs plus financing costs.

**Proof of Project Advancement** – Documentation demonstrating that a project is progressing on schedule and is staged for Commissioning on or before the end of the Reservation Timeframe.

**Qualifying System** – Distributed renewable energy systems meeting the qualifications for production of qualified Renewable Energy Credits in Arizona acceptable to the Arizona Corporation Commission as they may be defined for affected utilities to meet any renewable energy standards.

**Renewable Energy Credit (“REC”)** – One Renewable Energy Credit is created for each kWh, or kWh equivalent for non-generating resources, derived from an eligible renewable energy resource. RECs shall include all environmental attributes associated with the production of the eligible renewable energy resource.

**Reservation** – A dollar amount committed by the utility to fund a project if all program requirements are met.

**Reservation Status** – Indicator relating to approval or denial of a Reservation request. If a Reservation is approved, the Reservation Status is Reserved. If a Reservation request is denied, the Reservation Status is either Cancelled or Wait Listed.

**Reserved** – Status indicating the acceptance of a Reservation request.

**Reservation Timeframe** – The duration of the utility’s funding commitment for a Reservation.

**System Costs** – Costs associated with the Qualifying System components, direct energy distribution, system control/metering, and standard installation costs directly related to the installation of the Qualifying System.

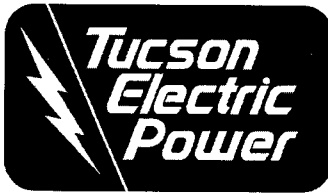
**Up Front Incentive (UFI)** – One time incentive payment based on system capacity or estimated energy kWh production rather than on measured system output.

**Wait List** – Status indicating Applicant has met program requirements, but the Utility has insufficient funding to commit to funding the project.



# EXHIBIT

"6"



**Renewable Energy Standard and Tariff Surcharge  
REST-TS1  
Renewable Energy Program Expense Recovery**

A UniSource Energy Company

**APPLICABILITY**

Mandatory, non-bypassable surcharge applied to all energy consumed by all customers throughout Company's entire electric service area.

**RATES**

For all energy billed which is supplied by the Company to the customer, the price shall be ~~\$0.00863697988636~~ per kWh of metered monthly energy consumption on all kWh consumed per meter that month up to and including a monthly cap of:

For Residential customers:	<del>\$4,888.00</del> 3.20 per month
For Small Commercial customers:	<del>\$160.00</del> 200.00160.00 per month
For Large Commercial customers:	<del>\$760.00</del> 950.00760.00 per month
For Industrial customers:	<del>\$3,600.45</del> 000.003,600.00 per month

Notes: (1) A Large Commercial customer is one with monthly demand greater or equal to 200 kW but less than 3,000 kW.

(2) An Industrial customer is one with monthly demand equal to or greater than 3,000 kW.

(3) For non-metered services, the

– lesser of the load profile or otherwise estimated kWh required to provide the service in question, or the service's contract kWh shall be used in the calculation of the surcharge.

This charge will be a line item on customer bills reading "Renewable Energy Standard Tariff."

**RULES AND REGULATIONS**

The standard Rules and Regulations of the Company as on file with the Arizona Corporation Commission shall apply where not inconsistent with this pricing plan.

**TAX CLAUSE**

To the charges computed under the above rate, including any adjustments, shall be added the applicable proportionate part of any taxes or governmental impositions which are or may in the future be assessed on the basis of gross revenues of the Company and/or the price or revenue from the electric energy or service sold and/or the volume of energy generated or purchased for sale and/or sold hereunder.

Filed By: Raymond S. Heyman  
Title: Senior Vice President  
District: Entire Electric Service Area

Tariff No.: REST-TS1  
Effective: February-January 1, 2011  
Page No.: 1 of 1



**Renewable Energy Standard and Tariff Surcharge  
REST-TS1  
Renewable Energy Program Expense Recovery**

A UniSource Energy Company

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**APPLICABILITY**

Mandatory, non-bypassable surcharge applied to all energy consumed by all customers throughout Company's entire electric service area.

**RATES**

For all energy billed which is supplied by the Company to the customer, the price shall be \$0.008636 per kWh of metered monthly energy consumption on all kWh consumed per meter that month up to and including a monthly cap of:

For Residential customers:	\$4.88 per month
For Small Commercial customers:	\$160.00 per month
For Large Commercial customers:	\$760.00 per month
For Industrial customers:	\$3,600 per month

- Notes: (1) A Large Commercial customer is one with monthly demand greater or equal to 200 kW but less than 3,000 kW.  
(2) An Industrial customer is one with monthly demand equal to or greater than 3,000 kW.  
(3) For non-metered services, the lesser of the load profile or otherwise estimated kWh required to provide the service in question, or the service's contract kWh shall be used in the calculation of the surcharge.

This charge will be a line item on customer bills reading "Renewable Energy Standard Tariff."

**RULES AND REGULATIONS**

The standard Rules and Regulations of the Company as on file with the Arizona Corporation Commission shall apply where not inconsistent with this pricing plan.

**TAX CLAUSE**

To the charges computed under the above rate, including any adjustments, shall be added the applicable proportionate part of any taxes or governmental impositions which are or may in the future be assessed on the basis of gross revenues of the Company and/or the price or revenue from the electric energy or service sold and/or the volume of energy generated or purchased for sale and/or sold hereunder.

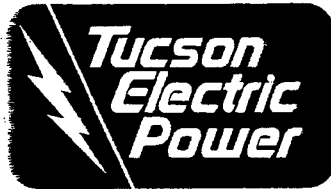
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Filed By: Raymond S. Heyman  
Title: Senior Vice President  
District: Entire Electric Service Area

Tariff No.: REST-TS1  
Effective: January 1, 2011  
Page No.: 1 of 1

# EXHIBIT

"7"



## Customer Self-Directed Renewable Energy Option REST-TS2 Renewable Energy Standard Tariff

A UniSource Energy Company

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### AVAILABILITY

Open to all Eligible Customers as defined at A.A.C. R14-02-1801.H.

### APPLICABILITY

Any Eligible Customer that applies to the Company under this program and receives approval shall participate at its option.

### PARTICIPATION PROCESS

An Eligible Customer seeking to participate shall submit to the Company a written application that describes the Distributed Renewable Energy (DRE) resources or facilities that it proposes to install and the estimated costs of the project. The Company shall have sixty (60) calendar days to evaluate and respond in writing to the Eligible Customer, either accepting or declining the project. If accepted, the Customer shall be reimbursed up to the actual dollar amounts of customer surcharge paid under the REST-TS1 Tariff in any calendar year in which DRE facilities are installed as part of the accepted project. To qualify for such funds, the Customer shall provide at least half of the funding necessary to complete the project described in the accepted application, and shall provide the Company with sufficient and reasonable written documentation of the project's costs. Customer shall submit their application prior to May 1 of a given year to apply for funding in the following calendar year.

### FACILITIES INSTALLED

The maintenance and repair of the facilities installed by a Customer under this program shall be the responsibility of the Customer following completion of the project. In order to be accepted by the Company for reimbursement purposes, the project shall, at a minimum, conform to the Company's System Qualification standards on file with the Commission. (REST Implementation Plan, Renewable Energy Credit Purchase Program – RECPP, Distributed Generation Interconnection Requirements, Net Metering Tariff, Company's Interconnection Manual)

### PAYMENTS AND CREDITS

All funds reimbursed by the Company to the Customer for installation of approved DRE facilities shall be paid on an annual basis no later than March 30<sup>th</sup> of each calendar year. All Renewable Energy Credits derived from a project, including generation and Extra Credit Multipliers, shall become the property of the Company and shall be applied towards the Company's Annual Renewable Energy Requirement as defined in A.A.C. R14-2-1801.B.

### RULES AND REGULATIONS

The standard Rules and Regulations of the Company as on file with the Arizona Corporation Commission shall apply where not inconsistent with this pricing plan.

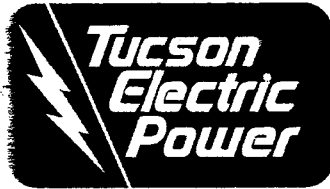
### RELATED SCHEDULES

- REST-TS1 - Renewable Energy Program Expense Recovery

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Filed By: Raymond S. Heyman  
Title: Senior Vice President  
District: Entire Electric Service Area

Tariff No.: REST-TS2  
Effective: January 1, 2011  
Page No.: 1 of 1



## Customer Self-Directed Renewable Energy Option REST-TS2 Renewable Energy Standard Tariff

A UniSource Energy Company

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### AVAILABILITY

Open to all Eligible Customers as defined at A.A.C. R14-02-1801.H.

### APPLICABILITY

Any Eligible Customer that applies to the Company under this program and receives approval shall participate at its option.

### PARTICIPATION PROCESS

An Eligible Customer seeking to participate shall submit to the Company a written application that describes the Distributed Renewable Energy (DRE) resources or facilities that it proposes to install and the estimated costs of the project. The Company shall have sixty (60) calendar days to evaluate and respond in writing to the Eligible Customer, either accepting or declining the project. If accepted, the Customer shall be reimbursed up to the actual dollar amounts of customer surcharge paid under the REST-TS1 Tariff in any calendar year in which DRE facilities are installed as part of the accepted project. To qualify for such funds, the Customer shall provide at least half of the funding necessary to complete the project described in the accepted application, and shall provide the Company with sufficient and reasonable written documentation of the project's costs. Customer shall submit their application prior to May 1 of a given year to apply for funding in the following calendar year.

### FACILITIES INSTALLED

The maintenance and repair of the facilities installed by a Customer under this program shall be the responsibility of the Customer following completion of the project. In order to be accepted by the Company for reimbursement purposes, the project shall, at a minimum, conform to the Company's System Qualification standards on file with the Commission. (REST Implementation Plan, Renewable Energy Credit Purchase Program – RECPP, Distributed Generation Interconnection Requirements, Net Metering Tariff, Company's Interconnection Manual)

### PAYMENTS AND CREDITS

All funds reimbursed by the Company to the Customer for installation of approved DRE facilities shall be paid on an annual basis no later than March 30<sup>th</sup> of each calendar year. All Renewable Energy Credits derived from a project, including generation and Extra Credit Multipliers, shall become the property of the Company and shall be applied towards the Company's Annual Renewable Energy Requirement as defined in A.A.C. R14-2-1801.B.

### RULES AND REGULATIONS

The standard Rules and Regulations of the Company as on file with the Arizona Corporation Commission shall apply where not inconsistent with this pricing plan.

### RELATED SCHEDULES

- REST-TS1 - Renewable Energy Program Expense Recovery

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District: Entire Electric Service Area

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# EXHIBIT

"8"

### **Research and Development**

In order to support the adoption of renewable energy, Tucson Electric Power Company ("TEP") dedicates some of its current REST funding towards research and development. The Company's 2011 Implementation Plan proposes to continue with TEP's commitment to further renewable energy research by participating in the following projects.

#### **A. Electric Power Research Institute Plan**

TEP is planning to subscribe with the Electric Power Research Institute ("EPRI") in 2011 in order to acquire the following project studies. The estimated cost of subscription is \$300,000.

- Project P173.006: Advanced Planning Tools to Study the Impact of Variable Generation and Controllable Loads.
  - This project will investigate future load composition, system load shapes, business cases for energy storage, regulatory policy impacts and the value of ancillary services as affected by integrating high penetrations of renewable generation, controllable loads, plug-in Hybrid Electric Vehicles ("PHEV"), energy storage, and demand response. Information developed through this project will prove useful to members when planning their future transmission grids. The estimated cost for this project is \$8,200.
- Project PS84A: Renewable Energy Economics and Technology Status.
  - This project set provides basic information on the status of all renewable technologies. Electricity sector analyses help define the role of renewable generation and improve understanding of the policy implications. The projects will deliver the renewable energy technology guide ("RETG"), newsletters, perspectives on current topics, engineering and economic analysis, industry tours, presentations from industry experts, and forums for participants to exchange information. The estimated cost for this project is \$76,500.



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- Project PS174A: Integrating Renewables into Distribution.
  - This project set focuses on the distribution system's readiness for high penetration of renewable and distributed generation ("DG"). The first project is related to incremental increases of DG in to existing distribution, both radial and network. The second project assesses future distribution system designs and related options for integrating anticipated high penetration of renewable and distributed generation. These are aligned with EPRI's Green Circuits, Smart Grid and Intelligrid programs. The cost estimate for this program is \$15,300.
- An additional transmission study will also be done to gain intelligence of the impacts of renewable generation on regional transmission systems. The cost of this is \$200,000.

### **B. Grid Stability Study**

TEP will contract with Utility Solar Engineering ("USE") to provide solar generation resource integration information at a feeder, substation, switchyard, and system wide level. The impacts of large DG penetration on TEP's system will be studied, including capacity limitations, operational requirements, and the assessment of TEP's operations relative to incorporating large renewable capacity into the system. Sufficient high resolution data has been taken at TEP's Springerville Generating Station Solar System ("SGSSS") to provide a high resolution solar generation output model that includes local cloud effects that can be defined and verified. The model will support analysis with residential solar photovoltaic ("PV") generation systems of different degrees of energy density and amounts of total annual solar energy production capacity throughout the TEP service territory, as well as high energy density utility scale PV generation units of different capacity ranges throughout the TEP system. USE will build and populate the solar generation model to provide the daily production data sets at one second intervals for the final 300 selected modeled solar generation scenarios in Excel spreadsheets and comma delimited file formats, which would include solar generation by feeder and aggregated to

## **TEP Exhibit 8**

individual substations, individual switchyards and system wide. TEP's internal resources will evaluate the model data via TEP's Energy Management System to (i) apply varying generation resource scenarios for TEP operations; (ii) review Resource Planning criteria for future planning needs; and (iii) provide Transmission Planning with a dynamic tool that can help in determining varying intermittency cases for installed solar systems in TEP's service territory. The cost estimate for this program is \$150,000.

### **C. Davis-Monthan Air Force Base DG Circuit Analysis**

TEP will contract with USE to provide information regarding two Davis-Monthan Air Force Base ("DMAFB") feeders that interconnect with a large ground mount and many roof mounted PV systems. Impacts to electrical supply characteristics will be assessed for a high percentage of solar generation within a distribution feeder. USE will analyze the impact of distributed PV generation on these two circuits fed by the DMAFB Actus substation; results will identify the costs and performance of DG on TEP's system and the impact to the feeders for intermittency and interruptions in service. The scope of work includes the specification, purchase, installation and data collection from two ION8600A high resolution meters, one of which will be placed on a generally residential district load with 2.0 megawatts ("MW") (DC) of installed distributed solar generation and the other on a feeder for a single 3.275 MW (DC) solar generator. Synchronized, time stamped data in one second intervals will be collected from the meters via a cell phone communications path several times a day; the information will be delivered to the ION Enterprise server and then made available for download by USE on a secure website available via the Company intranet. The information will be processed daily by USE to include phase voltages, phase currents, phase harmonics and power factor. The cost estimate for this program is \$50,000.

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### D. Irvington/Sundt Test Yard Plan

TEP continues to provide training and testing of new solar products at the Irvington/Sundt test yard, where several manufacturers of PV products are represented. TEP is working with the University of Arizona ("U of A") in tracking and assessing PV product data to determine product longevity, reliability, and applicability to various residential and commercial locations in Tucson. This project is estimated to cost \$300,000. Following is a list of planned project and testing models for 2011.

1. Test and compare the following new products of several manufactures for performance and output characteristics:
  - thin film technologies – fixed PV;
  - silicon crystalline technologies – fixed PV;
  - solon and other independent single and double axis concentrated PV ("CPV") and PV tracking systems;
  - building integrated PV;
  - battery storage technologies; and
  - pole-mounted PV systems.
2. Test, study, and/or compare the following products:
  - TEP's ramada shade cover PV system;
  - TEP's carwash solar hot water system;
  - pre-commercialization proof of concept for a U of A dual axis CPV system, in partnership with TEP;
  - solon crystalline modules;
  - solyandra tube PV;
  - various ground-mount CPV technologies;
  - pole mounted PV located just outside of TEP Test Yard #1; integrate data

## TEP Exhibit 8

acquisition system ("DAS") for communication;

- pole mounted LED lighting located in TEP Test Yard, and integrate DAS for communication;
- research and technology development of various Solon products in Yard #2; compare to two other sites in Italy and Germany for performance;
- research and technology development in Yard #3 including:
  - i. advanced and new PV/CPV;
  - ii. plan and install civil and electrical infrastructure;
  - iii. installation of one or more single axis PV tracker systems for performance testing;
  - iv. design and install ground mount BIPV systems for performance comparison;
  - v. refurbish and install TEP's solar trailer into Yard #3 for battery performance testing; and
  - vi. install one 6 kW battery storage system and compare performance to solar trailer batteries and environmental conditions (Greensmith Battery Storage Technology)
- research and technology development in Yard #4 including:
  - i. partner with U of A for the installation of a new CPV tracker system; TEP to provide the labor and materials, U of A to provide the main tracker equipment;
- design and install a new commercial scale hot water system at the TEP carwash facility;
- design and install 15 kW of PV on the existing Green Team ramada location; and
- design and install 30 kW of existing PV modules and an inverter at a designated location on the TEP site.

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### E. Arizona Research Institute for Solar Energy

The Arizona Research Institute for Solar Energy ("AzRISE") at the U of A conducts fundamental interdisciplinary solar energy research, backed by accurate and realistic economic analyses, for the deployment and practical implementation of solar energy solutions that TEP believes has direct relevance toward supporting the REST goals. TEP's use of REST dollars spent with AzRISE as a research partner helps to further the renewable energy market and helps TEP meet its renewable goals. AzRISE will be responsible for ongoing data management for the TEP Solar Test yard and ongoing distributed generation production analysis specific to Arizona. Both of these projects represent significant contributions to the local knowledge base that will be required to make the use of solar energy more effective. This project will cost \$250,000.